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NUMBER 86

# COMPUTER WEEKLY International

THURSDAY, SEPTEMBER 14, 1978

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370 Software Support

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## INTERNATIONAL BRIEFING

### Munich clash with Sicob

An unseemly row is brewing between the French and the Germans in the usually civilised arena of international exhibitions. Earlier this year, the German organisers of the Orgatec '78 office equipment exhibition, set for October 24-28, indicated their intention of usurping Sicob's position as the major autumn office equipment show. Now Sicob chairman Max Hermieu has another challenge to contend with: the biennial Systems show in Munich is to be brought forward from its usual mid-October date to clash directly with Sicob in September 1978.

• Sicob preview — page 35.

### Scanner for Libya

LIBYA has become the first country in North Africa to order an EMI scanner. The Galaa Hospital in Benghazi is to have a CT1010 computerised head scanner, for use in diagnosis of head injuries after traffic accidents — a serious problem in Benghazi.

### Imminent

JAPANESE manufacturer Fujitsu is about to start US manufacture of 50 Megabyte OEM disc drives for minicomputers at its Sunnyvale, California plant.

### Univac addition

A NEW model in the Univac 1100 line aimed specifically at the large-scale scientific and engineering markets is reported to be under development at the company's Roseville, Minnesota facility.

### Transpac shares

THE company set up to operate the French Transpac packet-switched network is capitalised at 20 million francs, and will be owned 67% by the state, 28% by a company called Utipac, owned by users of the network, and 5% by employees of Transpac and the French PTT. Due to begin service with 1,800 users at the end of the year, it is to grow to 25,000 by 1985.

### Brazil network

THE Brazilian telecommunications company, Embratel, has accepted Nippon Electric's tender for a digital data communications network which included Siemens, Philips and ITT.

Giat Brocades has several fermentation units for penicillin production at Delft, each unit

standing as high as a three-storey building.

As an individual batch of

penicillin takes several days to complete, the tanks are operated

in a phased sequence. The duplex

GA-18/440 system has been in-

stalled to provide the best pro-

tection against equipment fail-

ure.

Operator monitor production

via VDU's which provide a con-

tinuous check on control pa-

rameter and signal alarms in

the event of failure. Reports are

produced on teletypes on a daily

and shift basis.

• Our picture shows one of

Giat Brocades penicillin units at

Delft which will be controlled by

the General Automation system.

THE French government's

microelectronics plan is be-

ginning to take shape, and two

developments have just been

announced. Rhone-Poulenc,

the big chemical company, is to set

up a 50-50 joint venture with

the Atomic Energy Commission,

to make the basic materials needed

for semiconductor manufacture.

The Commission has also

formed a joint venture with

Thomson-CiC/CFCIS; it will

get 40 million francs of govern-

ment support, and pay Motorola

in the region of \$10 million for

technology. A third develop-

ment, a new company called

Seclmos, in which Intel is likely

to have a 20% stake, is still under

discussion (CW, August 17).

told Computer Weekly. "It

recently established a software

subsidiary, and Midas is the first

product to be taken up. It was a

particularly suitable choice.

BIS is developing a Swift in-

terface on the IBM Series 1

minicomputer under contract

with an unnamed customer for

delivery in June next year. BIS

already has an interface for the

Chips New York interbank

clearing system, running on

Series 1.

"We chose System 32 for

Midas because we wanted a

machine with good, well-

developed software," he said.

Software compatibility with

the attractive new terminal-oriented

System 34 made it a

particularly suitable choice.

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terface on the IBM Series 1

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Series 1.</p

# Wall Street pundits fear 'reversal' on computers

THE ongoing rally on Wall Street may be the last big rise before a sharp decline, according to one technical analyst. However, that pessimistic view is not held by all Wall Street's pundits these days, and some investment advisers have interpreted recent events as a sign that investor confidence is truly on the upswing, which could lead to a continued bull market.

The bearish view is that of Joseph C. Generals, technical analyst at Oppenheimer, but its publication was preceded by a cautionary notice from the firm. Technical trend analysis is only one way to look at the market, and can result in inaccurate predictions.

Nevertheless, the Generals report is striking in its assuredness, and it is being read carefully by many serious investors, including many of the largest financial institutions in the States.

Generals foresaw the rise in the market that went on through August but he feels that a major decline in stock prices will follow as a four-year cycle comes to an end. A four-to-six-week rise in stock prices could, he believes, lead to a levelling-off of market averages. Then, next spring, Generals predicts there will be a steep drop in

stock values, with the Dow Jones industrial average, currently around 900, falling below 650 and possibly as low as 550. Such a decline would not necessarily include all stocks, but few companies could expect their share values to withstand any severe erosion of investor confidence.

Gene Collins, of Evans & Co, on the other hand, believes that investors will experience a long-term growth in the value of their stocks. He believes that Wall

Street's rising prices are due to

institutions seeking "beyond the valley of short-term difficulty" to a general improvement in the fortunes of American business.

Computer industry stocks, including IBM, have risen dramatically during the past few weeks, and the expectation of those with confidence in the market is that the prices of these stocks will continue to climb.

The key indicator to many investors will be the prime interest rates, those charged by banks to their customers. If the

expected decline in interest rates does not materialise soon, inflation will worsen and an economic downturn in the US would most likely ensue.

While some computer industry analysts, such as Oppenheimer's Gideon Gartner, have characterised IBM as "nearly recession-proof," recent history is by no means an infallible determinant of the financial prospects of the industry giant.

The key indicator to many investors will be the prime interest rates, those charged by banks to their customers. If the

**NEWS FROM AMERICA**  
BY  
**HESH WIENER**

# AT&T's digital network seen as threat to the mini market

**EVERYBODY** who is anybody on the American computer scene has been guessing at the impact of AT&T's planned digital network, the Advanced Communications System (CWS, July 27). But Howard Anderson, head of the Yankee Group, the US consultants has won the attention of big business — and it is expected he will soon earn the wrath of small computer

makers. Anderson, more than any other data processing pundit, is warning the minicomputer industry that ACS spells trouble for makers of small processors. ACS, says Anderson, will "expand the market for dumb terminals while shrinking the market for intelligent terminals. It will expand the market for computers but will shrink the

market for minicomputers because it will use minicomputers internally."

The one beneficiary of ACS among the mini makers, according to Anderson, will be Digital Equipment. "Instead of selling to the end users, DEC will be selling to the Bell System which will then resell the computer power to the end user." ACS is expected to use the PDP-11/70

or the forthcoming 11/74 in its local processing stations.

This shift in an important market may hurt such lively competitors as Data General, three choices — IBM, AT&T, a do-it-yourself approach.

The pressures on Data General, typical of those on other minicomputer makers, come from IBM, which increasingly adds utility to its Series I systems through the release of software packages, microcomputer makers, including the semiconductor houses, which have taken over large segments of the low-end processor market; and manufacturers of dedicated small business systems, which offer turnkey applications systems (Basic Four, for example) or greatly simplified programming (Logic Machine).

Hewlett-Packard will be vulnerable as well, because its computer group invested thousands of dollars in the development of networking software, sent out high-priced management consultants to promote its products as complementary to those of IBM, and put a series of intelligent terminals on the market based on current and future silicon-on-sapphire technology that cost a lot to develop. ACS could render much of the communications work at 11-P obsolete or unsaleable.

Hewlett-Packard, like many others, was led to its commitment by a belief among its managers that IBM will set the pace during the 1980s. With ACS most likely on the way, there will in fact be two choices for users with communications needs.

While IBM and AT&T battle for customers, those companies that have staked their future on selling private networks to America's industrial giants will be left to fight over the tiny bits of territory the giants overlook.

The Yankee Group, believes

that 62 per cent of the top 500

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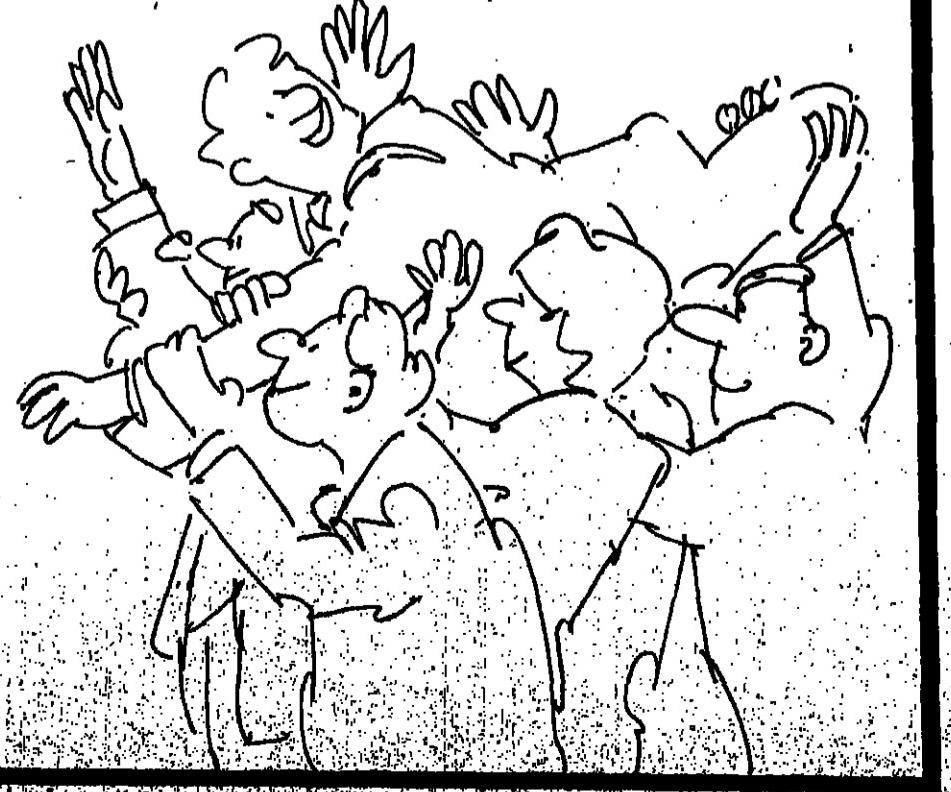
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Sweden

Stockholm 08-604120



## Government abandons magnetic passports

THE US government, which has been seeking an advanced way to control the use of passports, has abandoned earlier plans that included the issue of magnetic cards to passport holders, and according to some sources, all other citizens as well.

In an unrelated story, *Privacy Journal* notes that the National Centre for Health Statistics is developing a national death index computer, reportedly to aid medical researchers. The index will contain names, medical names, social security numbers and information about the death of the individual. The system is due to start in January.

*Privacy Journal*, a monthly published by Robert Ellis Smith, US commentator, reports that issues in the US, the first national death index, will be issued in 1979. The Post Office Board of Governors, DC 20402, has been replaced by Loren E. Lawrence, a career diplomat.

One reason for abandoning the magnetic card idea, according to the Washington periodical, is the cost involved. Magnetic passport cards cost \$10 each, while plastic cards cost \$1.50.

# Social Security files are 'not safe'

THE US Social Security Administration's financial and medical data files on millions of Americans "are not properly safeguarded from potential loss, destruction, abuse or misuse." That was the sobering message delivered by the US General Accounting Office in a report just made public.

In the fiscal year 1977, GAO states, the SSA's massive data processing system serviced over 33 million beneficiaries sharing some \$103,000 million annually. "With the vast number of records, and the number of offices involved in the SSA operations, safeguards must be present to prevent unauthorised alterations, destruction, abuse, or misuse of beneficiary records — a valuable national resource," the audit agency asserts.

According to GAO, the investigation of SSA's computer and telecommunications operations was prompted in part by reports to some Congressmen that SSA employees manipulate the files for personal profit. On one instance, GAO says, a "private company built a flourishing business by gaining unauthorised access to federal medical records and selling the information to many of the nation's largest insurance companies."

The Accounting Office also cites several system design and management problems at SSA which have led to "security weaknesses". They include the ability to create as well as query beneficiary files from most terminals, failure to use audit trail features within the system; failure always to lock terminals during non-working hours; and unlimited and unrestricted access to terminals.

Also, GAO points out, hard copy beneficiary records are vulnerable to potential abuse and/or misuse and destruction in most field offices because of problems associated with the way claimant files are stored; the readily available use of

HOWARD ANDERSON, boss of the Yankee Group, says the advent of AT&T's ACS will be a threat to small computer makers.

JUANITA KREPS... "Some countries beat us at our own game."

AT&T will devote enormous resources to marketing ACS.

The company's future, he says, is "inextricably linked" to ACS.

This is because the backbone of AT&T's business is presently in Long Lines division, which provides inter-city trunks. Long Lines, without ACS among its offerings, may well succumb to competition from Satellite Business Systems and the host of microwave services.

The Yankee Group's In-Depth report on ACS is available for \$690 from the company at Post Office Box 43, Harvard Square Station, Cambridge, Massachusetts 02138.

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**WASHINGTON REPORT**  
BY  
**CAMERON DAVIS**

RESEARCHERS at the US National Bureau of Standards have developed a Network Measurement System to help users evaluate the quality of computer services delivered through computer networks. The NMS measures the service delivered to the user rather than the internal operating efficiency of the system.

"All a computer network user wants to know is 'What's in it for me,'" explains an NBS spokesman. "He isn't terribly concerned with the throughput of the entire system."

With NMS, he says, users can determine the level of service being provided, decide on needed improvements, and evaluate the effects of changes made.

The NMS consists of a data acquisition device called the Network Measurement Machine and a Data Analysis Package that provides information about the quality of network service delivered to interactive terminal users, as well as the nature of user demand and network utilisation.

# Government offers users a network measurement system

The system measures network performance in terms of such quantifiable elements as response time (the elapsed time from the last keystroke made by the user to the time the user receives the response), and interactive turnaround time (the elapsed time from the beginning to the end of a specified job or function).

The NMS is implemented on a minicomputer employing regular and special purpose hardware controlled by a specially-written software system. The regular hardware includes the processor, an operator's console, disc and magnetic tape storage, two programmable clocks, and data communications interfaces.

Special purpose hardware is used to connect the NMS to the network to be measured. It includes an automatic calling unit and line selector for computer-controlled origination and answering of data calls, and a specially designed communications interface called a "data probe."



**ADM-31**  
**WITH TWO PAGES OF DISPLAY**

The ADM-31 is a low-cost high reliability desk top CRT with full editing, formatting and two pages of display. So the ADM-31 has twice the display potential with many of the attributes of terminals costing twice as much.

The ADM-31 is completely self contained, with a keyboard, control logic, character generator, refresh memory, and interface. What's more, it incorporates a microprocessor which augments its reliability while making it easier to use. Block transmission and protected fields are standard, with a printer port option.

The ADM-31's amazing 90 key keyboard is integrated with the main logic, and is capable of generating all 128 ASCII characters (upper and lower case, numerics, punctuation, and control). It features an integral numeric pad, with period, comma, tab, minus and numeral arranged in calculator style.

The ADM-31's editing capabilities let you clear the screen, or use a destructive cursor for a character range. Register and direct, absolute and relative addressing, and direct, absolute, absolute addresses to any X-Y coordinate. The controls let you skip protected fields, backspace, move up, down, return, home, and new line. And you can store Control Characters which are displayed as unique symbols.

The ADM-31 comes with character insert/delete, line insert/delete, erase to end of line/field/screen, back tab, clear to protected spaces, clear to unprotected nulls and set and reset copyprint.



**ADM-42**  
**ALL BUT THINKS FOR ITSELF**

The ADM-42 is a semi-intelligent terminal that gives the user flexibility of a full menu editing interface and transmission logic. Like the ADM-31, it features a full two-page display, but it also has an optional extended memory capable of adding data space in 2 page increments up to a maximum of 8 pages.

The terminal boasts a bright, easy-to-read, 2000 character display, full 128 ASCII character set, 16 function keys for 128 separate commands, and two separate cursor control keys, plus an optional Programmable Function Key feature that lets you define the function keys. An alternate character generator giving an additional 128 characters and a line drawing set is also available.

The ADM-42 displays on screen a wide range of information at a glance, and special symbols indicate the entry of all control characters in memory. The ADM-42's Field Protect Mode also allows rapid data entry into forms or instruction pages. The ADM-42's displayed data is formatted in 24 lines of 80 characters and it has an 80 character 256 lines for status indicators, or special messages.

Screen attributes of the ADM-42 include Field Blinking/Underline, Field Blanking and Reverse Video which, you, the computer, can designate for use on areas of the display.

And as a bonus to existing ADM-31 users the ADM-42 is upward compatible. So when you upgrade to the ADM-42 you don't worry about rewriting your software. Just plug the ADM-42 into the system you've been using all along.

The ADM-31 and ADM-42 are just part of the new Lear Siegler range of high technology computer products.

Need to know more? Use the reader enquiry number for full details.

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AT&T's submission of its proposed Advanced Communications System (ACS) to the US Federal Communications Commission for approval has once more focused attention on public data networks on both sides of the Atlantic. France was the first European country to offer specialised data networks of all types — circuit switched, packet switched, and leased channel, and the French PTT is the leading advocate of packet switched

networks, against the opposition of the West German Post Office, which advocates circuit switched networks.

The debate between the advocates of circuit switched and packet switched systems has hitherto obscured a much more important question. Is the separation of data from voice traffic a good idea on any but the shortest time scale with the minimum of investment? Will the sums now being invested in public networks help or hinder the development of data communications in the 1980s, and the widely predicted integration of telecommunications with data processing and office automation?

In this MARKETVIEW, Fred Lamond discusses the technological and economic background to the networks that already operate in France, West Germany and the UK, and the arguments for and against their further development in the next few years.

# Solving the dilemma of public networks

A DATA network is a specialised telecommunications system restricted to digital data exchanged between computer terminals, processors, and perhaps even facsimile receivers and transmitters, but excluding voice and TV.

It is characterised either by separate circuits from those of the normal telephone network, or by separate trunk circuits, or by both, and may have its own switching exchanges if it is a switched network.

Public data networks are those provided by the PTTs themselves, on which they provide either circuit switching or packet switching exchanges to link any user to any other.

In addition, the French and West German PTTs have given network names to some of the leased channel facilities that they provide to users for their private networks. Table I gives a list of public data networks offered in Europe and the line speeds that they offer.

In circuit switched data networks, PTT switching exchanges establish temporary circuit connection of given throughput speed between two computers and/or terminals connected to the network at any point. All error checking and correction and other handshaking procedures are left to end-to-end protocols implemented on the computers and terminals that users connect to these networks.

The time and distance dependent call charges make it no more expensive to implement an SNA-type hierarchical polling system on a circuit switched data network than a distributed network architecture like Decnet.

It was for the sake of the fast digital switching of temporary circuit connections that the West German Federal Post Office developed the separate Electronic Data System digital data network in 1978. This is a high level trunk network of

wideband PCM carriers connecting a single national switching centre in Mannheim with 17 other regional concentrators and access points, Figure 1.

Unlike Caducee, the German EDS uses PCM digital carriers for full-duplex 2,400, 4,800 and 9,600 bps communications, with additional 48K, 64K and 72K bps switched facilities within the Greater Paris area. West Germany opened a 2,400 bps Datex service in 1976 and 300, 4,800 and 9,600 bps Datex services in 1978.

Telx lines and the original 200 bps West German Datex lines are digital and separate from the telephone network only as far as the nearest telex exchange. There they are modulated into analogue waves by PTT modems and frequency division multiplexed on the same 48 KHz, 240 KHz and 2 MHz carrier channels as voice telephone lines.

The Caducee network shares the telephone network's PDM analogue carrier channels between its 14 access points and concentrators and the single switching centre in Paris. The subscriber end circuits are analogue, but the Paris switching exchange is digital. It can therefore accept digital switching signals from connected computers and terminals at 2,400 bps, and thus establish circuit switched connections in under 1 second.

Transpac will link at its inception 12 nodal switching exchanges and 13 other access points and concentrators throughout France. British plans for NPSS are more modest and provide for only three switching exchanges in London, Birmingham and Manchester with access points and concentrators in six other cities.

In packet switching networks, no trunk channel capacity is

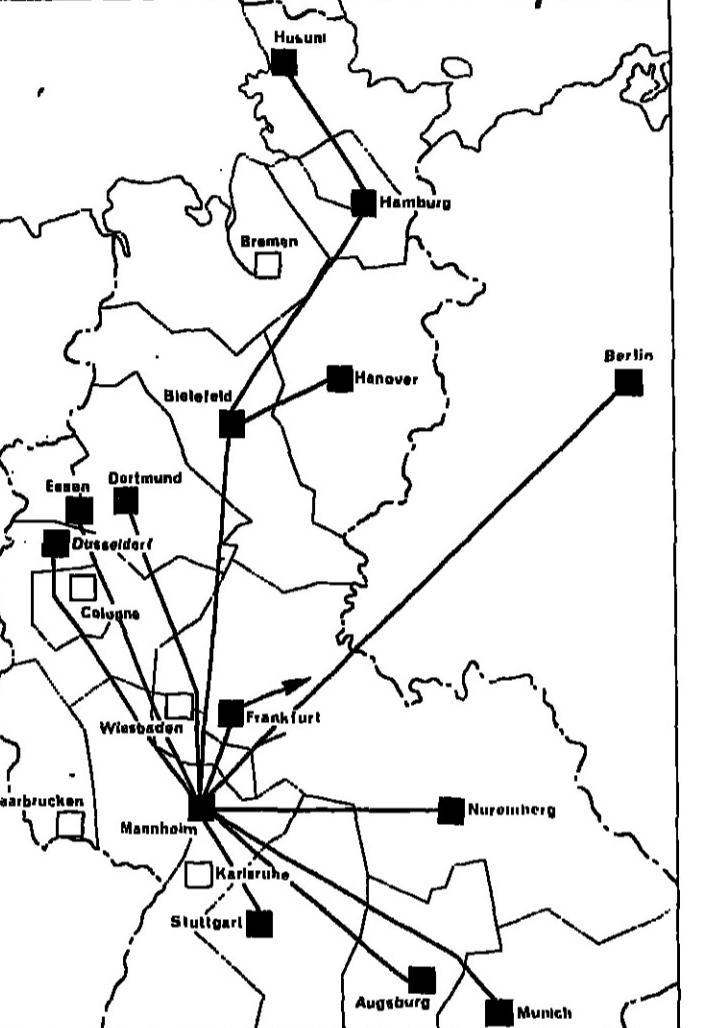


Figure 1: The West German Post Office EDS network as it stood in July 1978. The black squares show the concentrators in use in July, 1978; the white squares show the concentrators that are due to be in operation by 1980. Links to foreign networks are made via the Frankfurt exchange.

ever wasted as long as there is any data traffic from anywhere to take advantage of it. Trunk links between nodal exchanges

or concentrators are used to transport at a uniform speed standard "packets" of up to 1,024 information bits from any

of the up to 4,096 "logical channels".

As each packet contains its own logical channel number in its "envelope", packets from different logical channels can be interleaved on each trunk link between two nodes in any sequence as they arrive at the dispatching node.

This economy of trunk capacity usage is also reflected in the charges. While these contain a moderate connection fee, the main component will be for the transmission of each "packet" irrespective of the distance over which it travels.

Computer and terminal manufacturers and their users will not be alone in facing increased costs on packet switching networks. The PTTs' own investment in nodal switching mini-computers and their software to run a network like Transpac is considerable.

Is this a proper channel for investment of scarce public funds by state-owned monopoly common carriers? Could the same funds, if invested in additional microwave carriers or a communications satellite, not

be better used for long distance data communications by the banks, insurance companies and airlines are connected to private

and terminal manufacturers in additional hardware and software costs, that will inevitably be passed on to the users in the form of higher prices.

The only exceptions will be

teleprinter and TTY-compatible

display terminals with transfer rates of 300 bps or less.

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Computer and terminal manufacturers and their users will not be alone in facing increased costs on packet switching networks. The PTTs' own investment in nodal switching mini-computers and their software to run a network like Transpac is considerable.

Is this a proper channel for investment of scarce public funds by state-owned monopoly common carriers? Could the same funds, if invested in additional microwave carriers or a communications satellite, not

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KEITH JONES REPORTS FROM BUDAPEST

# Hungary keeps up with the latest banking techniques

AS one of Eastern Europe's healthiest and best managed economies, Hungary is very much a consumer oriented society these days. Its state-owned manufacturing enterprises take note of what people want and promote their wares through advertising, while house and flat purchasing is not only allowed but actively encouraged through long term interest loans.

When people in Hungary want a loan to buy a house or flat, if they need short term credit for a television, washing machine or some other consumer durable, they go to the National Savings Bank, OTP, an organisation that is adopting the most up-to-date data processing techniques to cope with its steadily increasing volume of business.

OTP's data processing operations are centred on a Siemens 4004 Model 45 mainframe installed in 1973 and one of the biggest applications run on the system these days is managing the two-and-a-half million OTP loans outstanding at any one time.

The method of repaying a loan is fairly simple, involving fixed amounts paid in each month at any of the 3,000 or so Post Offices or 748 OTP branches located around the country.

But the data capture workload created by the hundreds of thousands of payment documents received each week at OTP headquarters in Budapest has persuaded the bank to change from punch card and paper tape to OCR as the principal input technique.

OCR is an area of data processing technology not being

developed seriously in the Com-econ countries at the moment, so it made sense for OTP to look at the various systems manufactured in the West, with the US obviously the main source.

The system chosen was a Cummins-Allison 5400 mixed media configuration with 16 keystations for reject re-entry, and for non-OCR data capture as well as a high-speed OCR document reader. It was supplied to OTP by the Cummins-Allison European distributor, Scandata, a firm which already has two other Hungarian customers, the Central Statistical Office, KSH, and the Ministry of Building Works.

The deal negotiated by Scandata and Metrimpex, the Hungarian trading organisation for computers and electronic equipment.

The application is ideal for OCR. The monthly payment documents are printed by the Siemens's mainframe at OTP and each has a single line of OCR B numeric characters incorporating the account number of the loan, the monthly amount, a check digit, two digits that indicate the district the customer lives in, and one digit that signifies if the loan is short or



Joseph Keller (right) director of computing services at OTP in Budapest describes to Keith Jones the layout of the repayment document used by the bank's loan account holders. They are standing next to the Cummins-Allison OCR system installed at OTP earlier this year which can read 40,000 documents an hour.

long term. Batches of 12 documents cover payments for one year, printed and mailed to account holders, and those documents that are used to make payments at Post Offices come back to OTP via the Post Office headquarters in Budapest who submits them in batches of 12. Each batch is delivered to OTP along with a tally roll listing the amounts on all the documents and a batch total.

According to Keller, if there is any disagreement between the tally roll total and the total generated by the OCR system at OTP, the Post Office accepts OTP's figure and pays it, accepting that the OCR system is more accurate than its tally operators.

Being controlled by a General Automation SPC 16 microcomputer with a 128K main memory and 10 Megabytes on disc, the Cummins-Allison system cost a lot more than batch total, and has been programmed to RPG II to carry out disc sort account type and district.

The system processes a number of other smaller voice/document types, and OTP is to add a page reader to the configuration for capturing index book-keeping data.

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## Why the Post Office should drop NPSS

From page 31

switching exchanges is dropping rapidly.

These rising costs may well stifle the growth in European data communications, and allow the US to retain its present dominant position in the growing world market for public and professional computerised information databases.

This is a pity, because technical developments like viewdata and the new breed of integrated voice/data service terminals such as Nixdorf 8811 Datastar have the potential of creating an explosion in the demand for digital data communications facilities in the 1980s.

No wonder the British Post Office is still hesitating whether to go ahead with X25 compatible NPSS switching network to succeed EPSS in 1978, even though NPSS plans are much more ambitious than the French PTT's Transpac.

If the Post Office should decide finally not to implement NPSS at all, they should be gratulated for far-sightedness and thanked by data communications users for not saddling them with unexpected additional costs.

### Telex switch

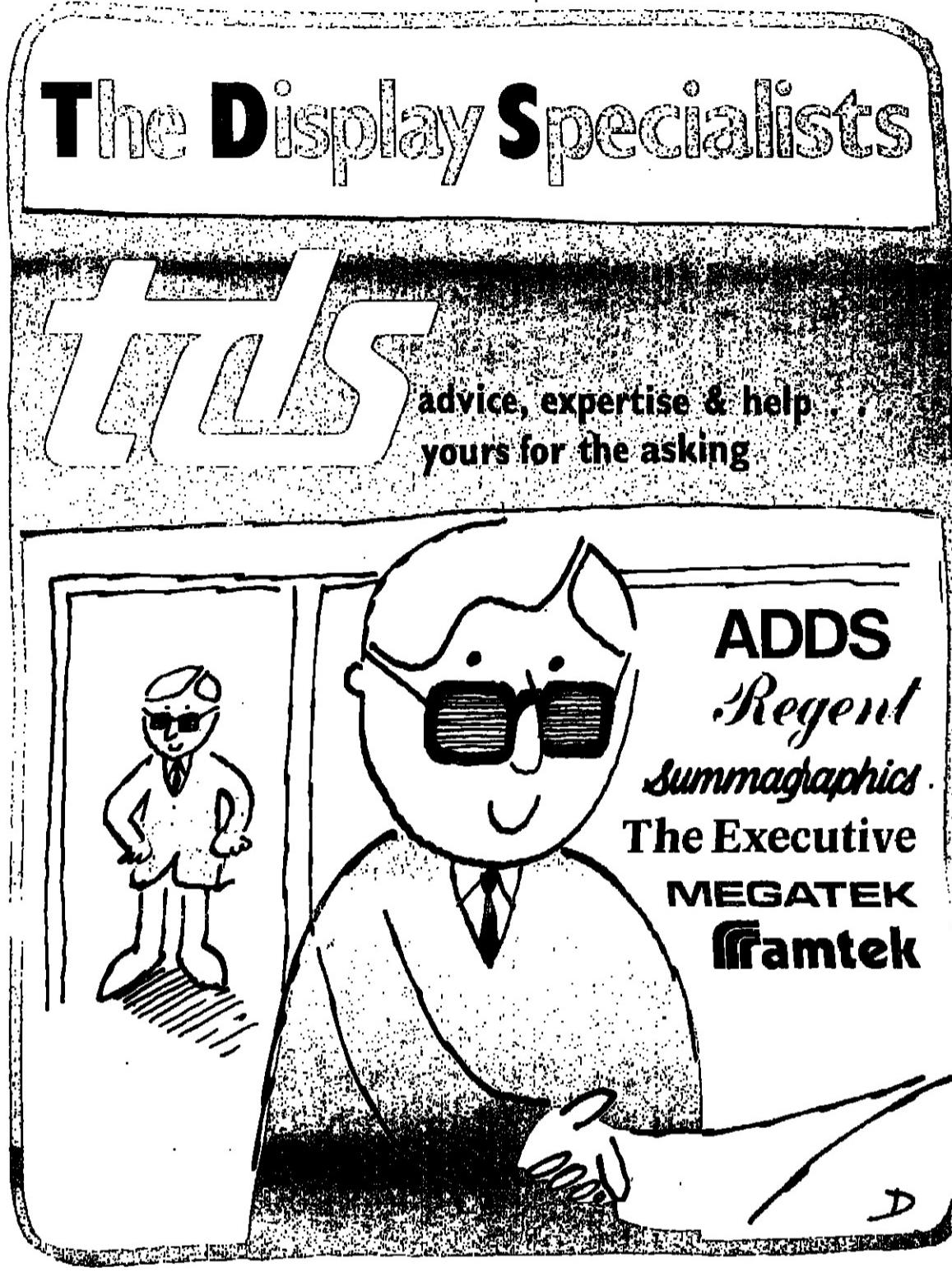
NORWAY'S telex traffic is switched by a £2 million X25 computer-controlled exchange from L M Ericsson in Sweden. The switch will be installed in Oslo and has several new services, including abbreviated dialling, direct broadcast, and store and forward.

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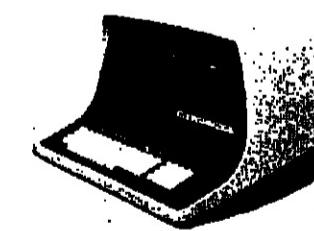
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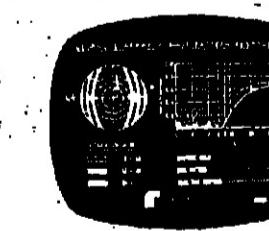


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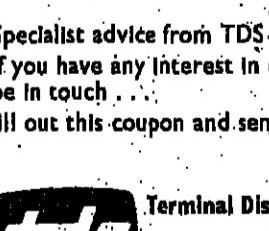
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**california  
updates  
P power****HAMBURG CONFERENCE ON ARTIFICIAL INTELLIGENCE****Less glamour, more science now**

**ARTIFICIAL** intelligence had its roots in theoretical work by the British mathematician Alan Turing and the Americans McCulloch and Pitts in the first half of this century. However, most of the work in this area has been done in the past 25 years. Until the late Sixties, most of it was done in the US, but since then there has been increasing activity in Russia, Japan, the Continent, and especially the UK. This conference reflected substantial progress by Continental researchers towards the UK and US standard.

The terminals are to be installed in over 500 law enforcement agency offices at Federal, State, regional and County levels, and will give officers instant access to criminal record files.

The contract will be welcomed by Univac, which acquired the installed base of RCA computers when it pulled out of the computer business some seven years ago. The Spectra 70 was built under licence in the UK by the English Electric (now ICL) System 4.

**Middle East order**  
A LARGE contract in the Middle East has been won by Plessey Communications and Data Systems, of Beeston, Nottingham. Private manual switchboards and telephones worth £375,000 have been ordered by the Jordan Telecommunications Corp.

Over 175 researchers from 15 countries met in Hamburg recently to report recent work in Artificial Intelligence (AI), the analysis of human mental faculties by computational methods. The conference was sponsored by the Society of Artificial Intelligence and Simulation of Behaviour, an international organisation based in Britain, and the Gesellschaft für Informatik, the German computer science organisation. One of the participants, Dr DREW McDERMOTT of Yale University, reports.

on the subject, although most of the work is still in its infancy.

There were several papers on vision research, the attempt to provide computers with eyes. As in other research areas, there has been no major "breakthrough" in vision work. Instead, we have had to settle for the more modest satisfaction that we are beginning to understand the problem — or, rather, the large complex of problems — of analysing visual input.

There were a few papers on language understanding, i.e. getting machines to communicate in a spoken or written human language. It seemed to me that natural language research is in a somewhat quiet period, possibly awaiting a shift in attitude, analogous to that in vision, toward the theoretical. This impression may be due to the under-representation at the conference of work from the US, where most natural-language research is still being done.

There were several papers on improvements of established AI techniques. Three such techniques are heuristic search (search through a practically infinite space guided by an estimate of distance to a goal), problem reduction (attacking hard problems by finding and debugging plans for solving them), and theorem proving (searching for a proof to satisfy a query).

It is theorem proving that continues to attract most attention in Europe, against the advice of the more experienced Americans. I think, however, there is hope that the Europeans are profiting by American mistakes rather than repeating them, and are being cautious in their application of this technique.

The conference was an enjoyable and profitable experience. This was largely due to the skill shown by Derek Sleeman and Hans-Helmut Nagel in running it. I was also struck by how harmonious it was. In the past, AI has often made up for lack of substance by loudness of arguments. Many conferences have witnessed noisy debates over issues that seem, in retrospect, irrelevant.

There was only one good old-fashioned debate at Hamburg, which turned on everyone's different understanding of the concept of "heterarchy" (which has to do with how programs are organised into modules).

During the rest of the conference, attention was focused on narrow technical questions. This trend will have the effect of making AI much less glamorous to the uninitiated, which is as it should be. All sciences are boring from the outside, and we seem to be acknowledging at last that AI is a very difficult science, whose basic outlines are not yet visible.

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**US industry  
boosted by  
defence budget**

**HESH WIENER REPORTS FROM NEW YORK**

THE computer industry, along with electronics and communications, was the recipient of a substantially increased value of US Defence Department contracts during fiscal year 1977, according to a study just published in New York. Among the big guineas were IBM, Texas Instruments and Sperry Rand.

The study, a review of America's top defence contractors, cites government figures that show the Carter Administration's planned spending for research and development as well as production crossed the \$50,000 million barrier during the past year. The total value of contracts during fiscal year 1976 was \$42,000 million.

Among the computer manufacturers, IBM made the most dramatic gain in defence contracts. In fiscal year 1976, the corporation was the 30th largest US defence contractor, receiving a total of \$265 million, equal to 1.5% of its revenues, from the military. This past year, IBM got \$547.1 million in commitments from the same source, making it the 17th largest defence contractor. That sum represents 2.9% of IBM's revenues.

Honeywell managed to get its allocation from the Defence Department raised to \$458.7 million in fiscal year 1977; up from \$385.7 million the year before. Honeywell managed to get its allocation from the Defence Department raised to \$458.7 million in fiscal year 1977; up from \$385.7 million the year before.

Nevertheless, because other companies were moving ahead faster, the 15% of its revenues derived from defence work did not improve Honeywell's relative ranking among defence contractors, and the corporation slipped from 19th to 20th in 1977.

Sperry Rand, parent of Univac, stayed at 15th place among America's top defence suppliers. The \$65.5 million Sperry was promised in fiscal year 1977, 19.8% of its gross revenues, was a big jump from the previous year's \$50.5 million.

Texas Instruments moved from the 41st position to 29th between 1970 and 1977, and increased its portion of income derived from defence contracts to 15.8% from 0.3%. To do so, the company more than doubled the sum it was awarded, getting \$324.1 million in 1977.

CDC and Burroughs represent a much smaller part of the defence business than other mainframe manufacturers. CDC, which in 1977 was the nation's 51st largest defence contractor, got \$132.5 million from the Defence Department. Just a bit more than the \$121.7 million it had received in 1976.

Burroughs, the 94th largest defence contractor, received only \$68.5 million in defence contracts during fiscal year 1977, but that was still a gain from the previous year's \$55.4 million.

Minimakers turn out in even greater force, and Digital Equipment, Hewlett-Packard, Data General, General Automation, Computer Automation, Interdata, Modcomp and SEL from the US will vie with SEMS and Intertechnique from France and Norsk Data from Norway for visitors' attention.

As befits the flag-carrier of the French industry, the CII-HB stand is always imaginative and eye-catching, and this year's display promises to be no exception.

Inspired by the futuristic Roissy-Charles de Gaulle airport to the north of Paris, the stand will consist of a number of satellites around a central concourse, each satellite featuring a

BRITISH-MADE telegraph compatible visual display units are replacing electromechanical teletypers in Pan Am's Heathrow-based message switching network covering Europe and the Middle East. Initial installations in London, part of an £80,000 order for 30 AT&T Vitec units, have enabled Pan Am's 16 operators to handle 3,000 messages a day, said to be a considerable increase partly caused by the new stand-by tickets.

Further units will be installed in Paris, Rome, Tel Aviv, and 2,400 post offices worldwide.

**Pan Am network gets  
British-made VDUs**

**TIM PALMER PREVIEWS THE 29th SICOB WHICH OPENS IN PARIS NEXT WEEK****31 countries  
put their office  
wares on show**

THE 29th annual Sicob exhibition opens next Wednesday, September 20. Nine days later, when the show closes on Friday September 29, some 300,000 visitors from 111 different countries will have taken the opportunity to examine the products from 1,755 companies in the computer and office equipment business.

The conference was an enjoyable and profitable experience. This was largely due to the skill shown by Derek Sleeman and Hans-Helmut Nagel in running it.

I was also struck by how harmonious it was. In the past, AI has often made up for lack of substance by loudness of arguments. Many conferences have witnessed noisy debates over issues that seem, in retrospect, irrelevant.

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Statistics can never tell the whole story, but they emphasise the range and scope of Sicob, which is still run more as a hobby than a business venture by a group of French entrepreneurs who decided 30 years ago that France needed a showcase to demonstrate to the world its offerings for the office equipment market.

The show, which is open from 9.30 am to 6 pm, but closed on Sunday, September 24, is best reached by the RER fast Metro line. The fast trains take about 15 minutes direct to the exhibition centre, whereas road travellers are frequently delayed for up to half an hour by traffic jams close to La Défense.

Transpac will also be featured at IBM, where demonstration of a test attachment to the network using the Series 1 minicomputer is planned. IBM will also be featuring the System 32 and 34 small business computers, the Office System 6 word-processing system, to be shown for the first time with the Qume daisy-wheel printer, and the new 5110 desk-top computer.

IBM has three major stands at the show, and one normally devoted to the French-built 3750 computer-based telephone switching system will this year be used to demonstrate the way in which voice, data and other office traffic can be combined in a single system. Intriguingly, IBM does not name the system to be demonstrated, which could be a hint that the company is planning to launch the long-awaited successor to the 3750 at Sicob. It could also be the new Series 1 communications controller for the word processing system.

The line-up of exhibitors is as impressive as the raw statistics. Mainframers exhibiting are headed by the French national company CII-Honeywell Bull and the world number one, IBM, and also include Burroughs and NCR.

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tran.

Key-to-disc systems will be offered from Data 100 Corp, CMC-France and MDS, and on the graphics front, Calcomp will show the new 830-100 controller, the first time PIX has appeared at Sicob.

ITT's CGCT subsidiary will be showing the full line of Unimat telephone switching systems, which range from the 4020 supporting up to eight lines and 32 extensions, to the 4080, which takes up to 400 lines and 2,000 extensions. Post Office regulations preclude ITT from offering any but the 4080 in the UK.

Intel will be offering the 80/30 single board computer and will also feature the new 8086 16-bit

order to call up or enter data.

EMI Technology will feature the PIX remote communications facility for setting up a network around an IBM 370 mainframe — the first time PIX has appeared at Sicob.

British companies represented will include Ferranti, DRI and EMI Technology. Ferranti Cetec will be emphasising the CDA 40 free-standing desk-top online graphics system with digitiser table, VDU and minicomputer.

DRI will show the Timedata interactive terminal. This is unique in that it is based on an array of light-emitting diodes which are touched by a light-pen in

order

to

call

up

or

enter

data.

Facit, exclusive European distributor for Qume products, will introduce the Sprint 5 daisy-wheel printing terminal, which takes up to 400 lines and 2,000 extensions. Post Office regulations preclude Facit from offering any but the 4080 in the UK.

General Automation will be promoting the 220 DPS data entry system based on the GA 18/220 microcomputer, and will also feature the new 18/340.

Diablo is to offer its new 1650 word processing terminal which runs at up to 1,800 bauds, and will also feature new forms handling equipment for the first time.

A small-scale telephone switching system, taking eight to 32 exchange lines and 50 to 200 extensions, and called the TLC 7, is on offer from Jeumont Schneider for the first time.

Transpac will not begin public service until the end of the year, but several companies, including CII-HB are devoting exhibits to the network, and CII-HB will emphasise the hardware and software it has designed for getting on to Transpac.

Transpac will also be featured at IBM, where demonstration of a test attachment to the network using the Series 1 minicomputer is planned. IBM will also be featuring the System 32 and 34 small business computers, the Office System 6 word-processing system, to be shown for the first time with the Qume daisy-wheel printer, and the new 5110 desk-top computer.

IBM has three major stands at the show, and one normally

devoted to the French-built 3750 computer-based telephone switching system will this year be used to demonstrate the way in which voice, data and other office traffic can be combined in a single system. Intriguingly, IBM does not name the system to be demonstrated, which could be a hint that the company is planning to launch the long-awaited successor to the 3750 at Sicob. It could also be the new Series 1 communications controller for the word processing system.

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Burroughs has not settled all the details of its exhibit, but plans to emphasise the baby of its low-end line, the B80 office computer, which offers users a compatible growth path through the B800 to the powerful B1800 small mainframe.

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low-end

# Bank of America counters go live



By Tim Palmer

A few weeks ago, one of the most celebrated distributed data-base banking terminal systems, that of Bank of America, went live at the final branches on the network. Tim Palmer reports from San Francisco on the history of the system, the present stage of development, and on the bank's plans for the future.

THERE is a bank in the US which has installed a counter terminal network. It captures much of the day-to-day data required to update its files at the point of transaction, records it all on disc — and then scraps it.

It may sound like the subject of joke, yet, not only does the bank exist, it is the world's largest.

"We never intended to do anything else," insists Stephen Ernst, one of Bank of America's vice-presidents in the data processing services department.

"The tellers do not enter all

the data on the cheque, and the present system could not handle it if they did. The system is cost-justified on the basis of the tellers' time which it saves. One of

the main reasons for implementing the system was to improve

the service we offer our customers, and it enables us to process more customers per hour than we could previously.

Another advantage is that tellers no longer have to leave the counter to get account information."

Bank of America decided, in 1968, that it needed to provide some kind of online support to its branches.

"Bunker-Ramo won the contract with a variant of one of its existing brokers' terminals, and designed a branch controller to our specification. It has the DEC PDP-8 instruction set in the processor, which Bunker-Ramo builds, and integral modems from Racal-Milgo. The initial contract was for 1,200 controllers and 8,000 terminals.

"The introduction of batch computer processing put the clerical people in the branches in a worse position than they were in before the days of data processing," says Ernst.

"By 1973, our calculations showed that a teller terminal network would be cost-effective.

"We put out a specification for a terminal sub-system which would have some local intel-

ligence. "Bunker-Ramo won the contract with a variant of one of its existing brokers' terminals, and designed a branch controller to our specification. It has the DEC PDP-8 instruction set in the processor, which Bunker-Ramo builds, and integral modems from Racal-Milgo. The initial contract was for 1,200 controllers and 8,000 terminals.

"Our plan was to run a mainframe based system to support the terminals, and we had settled on IBM 370s using the Airline Control Program.

"We had bought ACP, together with the software support documentation, and were about to acquire four 370/168s to run the mainframe system, and also agreed that the GA system be turned into a production

an initial study of, what they called a Distributed Computing Facility. The results of the study indicated that by using minicomputers, we could build a lower cost system which would give more reliability and easier growth."

Board approval was sought for the 168s, and also for a test model of the minicomputer alternative. Five companies were asked to submit proposals for a test model of the distributed system, and the initial contract was won by General Automation in April, 1973.

Thus, the Bank of America Computerised Office Online System, Cools, was born. GA did the system software, with assistance from the bank, and Bank of America did the applications software.

"We started installing pilot terminals, supported by the IMS/DC control software on 370s while Cools was under development, and half the branches were on that system before Cools was ready," says Ernst.

The last branch went onto Cools system a few weeks ago on July 24, and the system now handles 11 million records of savings and checking accounts.

"We patched it together using our existing batch hardware and moving the system around dif-

ferent machines as necessary."

The fundamental unit of the system is the module, and each module consists of four GA 16/440 minicomputers.

The four minis are linked in an H arrangement, with the back two minis, at the top of the H, used as file handlers while the front two handle messages.

Bank of America has two main computer centres, one in San Francisco and the other in Los Angeles, and there are currently six modules installed at each centre. One module acts as a Network Operations centre at each site, and no component in the system is run at more than 50% of its rated capacity.

If one mini in a module fails, its neighbour takes over; if one module fails, the next one takes over, and if one whole centre goes down, the other centre can support the whole network.

There are two 9600 bps SDLC lines between the centres.

Four of the six modules at each centre handle checking and savings account inquiries, and one handles online data entry; each module is designed for eight transactions a second, and they are presently running at six a second. Each module is backed up by 200 Megabytes on disc, and carries the files for the branches to which it is dedicated; the bank has 1,100 branches, and there are over 8,000 terminals installed at present.

The system software was written in GA assembler, and the applications software in a proprietary macro language.

"We plan to begin using Cobol and Pascal next year," says Ernst, "but we felt it unsafe to use high-level languages to start with because we were unsure how much core we would need."

The original plan was to use bisynchronous communication, but a study of SDLC and of X25 indicated that 20% better line utilisation would be achieved with an SDLC-type protocol.

We used IBM's 1974 definition of SDLC but added a con-

tention mode of working, so-called in SDLC-B," says Ernst. The message processors poll terminals, but contention mode is used between the processors in each module.

"There were 11 bids, and five met our requirements. The five were Honeywell, NCR, General Automation, Modemip and Fujitsu of Japan.

"General Automation was the cheapest, and thus won the contract."

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## PT7 The other terminal for IBM and ICL mainframes FERRANTI

TECHNICAL problems relating to the growth of data communications services can be solved, but the real brake on international developments is more likely to come from a failure of telecommunications authorities to develop agreements quickly on standards, tariffs and other policies and strategies.

That was a central theme

which emerged from a two-week NATO Advanced Study Institute conference of telecommunications specialists which ended last week.

Over 80 delegates from Europe and North America attended the conference at the Chateau de Bovis in the south of France, and organised by Dr Ken Beauchamp, director of Lancaster University computer services, and Dr Jack Howlett, chairman of the National Committee on Computer Networks.

Institute conference of telecommunications specialists which ended last week.

Professor Peter Kirstein of University College, London, put his finger on the nub of the problem when he opened the first session.

Standards,

he said, are a key area.

There would be a growing

need to link private networks to public networks and to interlink public networks in different countries.

But he posed the question:

Who has the power and who has

the will to force the necessary agreement?

"Yesterday's experiments are today's services and today's experiments are clearly signs of tomorrow's needs," he said.

And if delegates failed to realise the significance of this, Dr Helms, of the Ispra research centre in Italy, discussed some of the major current "experiments" in the European public telecoms scene, such as Euronet, EIN and the European Space Agency projects.

Although co-operation between European PTTs is good, he said, it would take "a lot more talking" before a full around-the-clock service was possible.

Some of the problems awaiting international and national solutions were outlined by Ray Feldman, of the British Post Office. These relate to topics such as data ownership, operational needs and trans-national data flows, needs for standardisation and tariff agreements.

Among many new facilities available to the engineers using the new system will be colour video displays indicating stress points on vehicles under design.

The system will thus allow quick identification of areas where weight can be saved or where additional rigidity might be needed.

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## Ford links-up to Cyber

DESIGN engineers at Ford can now link in to a new Control Data Cyber 176 based at the Dearborn Engineering and Research Centre near Detroit. The new system, which replaces an IBM 650 that has been in service since 1957, will service 85 locations throughout Europe, and US and Asian locations.

Among many new facilities available to the engineers using the new system will be colour video displays indicating stress points on vehicles under design.

The system will thus allow quick identification of areas where weight can be saved or where additional rigidity might be needed.

## International PTTs hold key to telecoms growth

## 'Regulatory regime will inhibit electronic message systems'

THE regulatory mechanisms developed to monitor and control Electronic Message Systems are likely to inhibit the growth of such services.

The prospect that computer terminals will become the printing press of the future and data networks the medium through which the creation and dissemination of ideas takes place is certainly foreseeable," states

that is the conclusion of a report prepared for the US Federal Communications Commission by Kalba Bowen Associates of Cambridge, Massachusetts in conjunction with the Centre for Policy Alternatives at the Massachusetts Institute of Technology.

In Europe, the report suggests, electronic message services are likely to become part of the State PTT monopoly, but in the US it could lead to the opening of mail services to private enterprise.

Echoing the Nato communications conference (see above), the report believes that, whatever regulatory method is chosen, the limits to growth of

the services will relate to administrative and management issues rather than to technical developments.

The report urges the FCC to undertake immediately additional studies on such specific areas as the likely costs and capital requirements of establishing public, nationwide EMS services; the economic effects of EMS services offered by existing or new carriers on other carriers and services and the international issues raised by EMS.

The 300-page Electronic Message System report is available at \$30 per copy from Kalba Bowen Associates Inc., 12 Arrow Street, Cambridge, Massachusetts 02138, US.

tends, the US Postal Service will not play a major role in the widespread development of EMS services, "for institutional and policy reasons, including an unwillingness to duplicate the work of private enterprise, and a lack of R&D capability."

Although it is "unlikely" that the USPS will provide more than selected EMS services, the report says, the siphoning off of much traffic into private electronic channels would adversely affect postal unit costs and postal deficits.

The report warns the FCC that regulations of this nascent technology could become almost impossible "if or when EMS moves from being a specialised business service to being a major means of social expression and communication."

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Service as part of the first-class mail.

One firm interested in being a mail dissemination contractor is Western Union.

The US Post Office wants private sector firms to operate Econ networks because the electronic movement of information is not within its present mandate. However, in the longer term it could introduce its own electronic mail service and is currently evaluating equipment.

There are also plans to start experimental electronic mail transmissions between the US and Europe early next year (CW, June 15).

At each Post Office they will be printed out, put into envelopes and delivered by the Postal

Service as part of the first-class mail.

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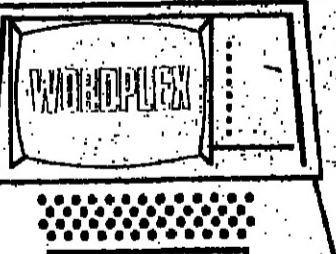
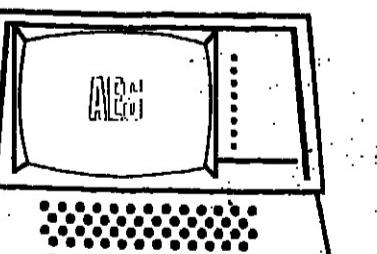
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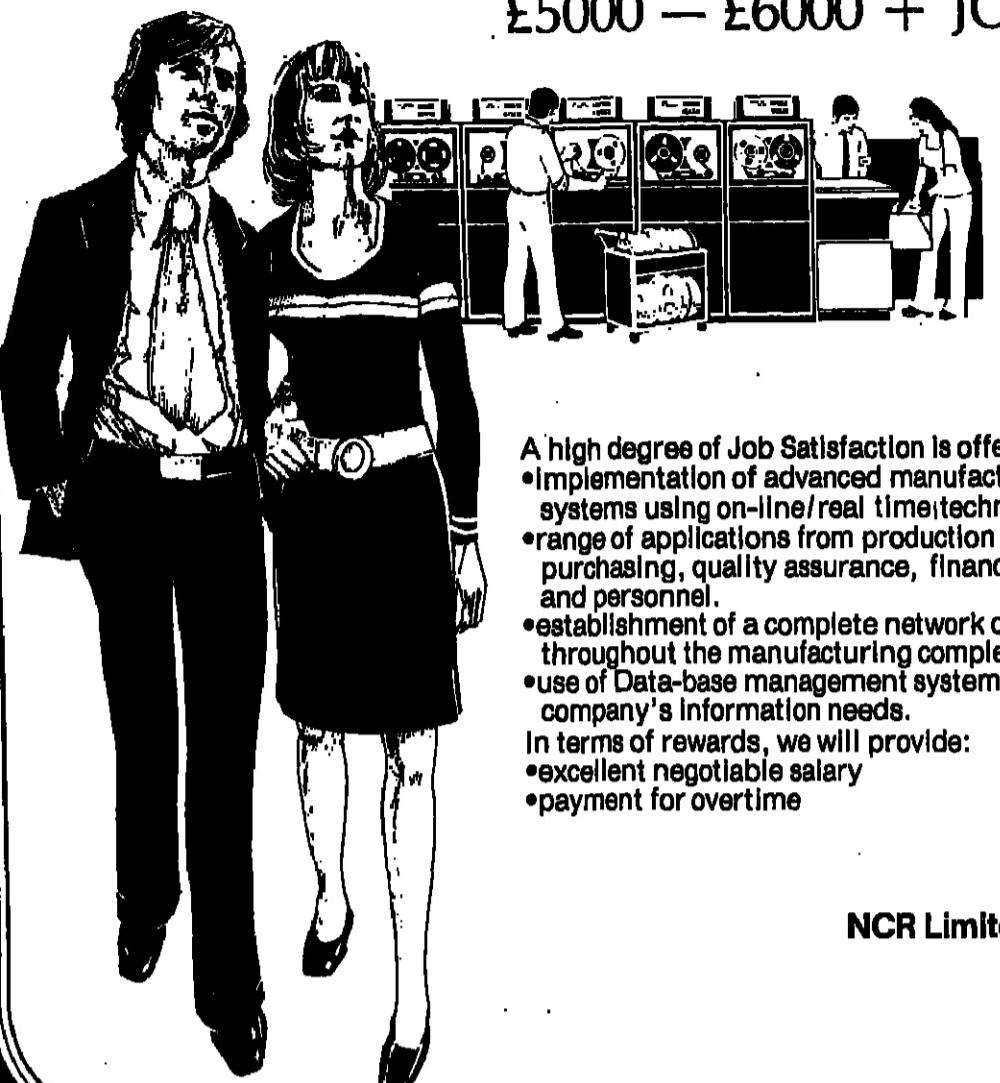
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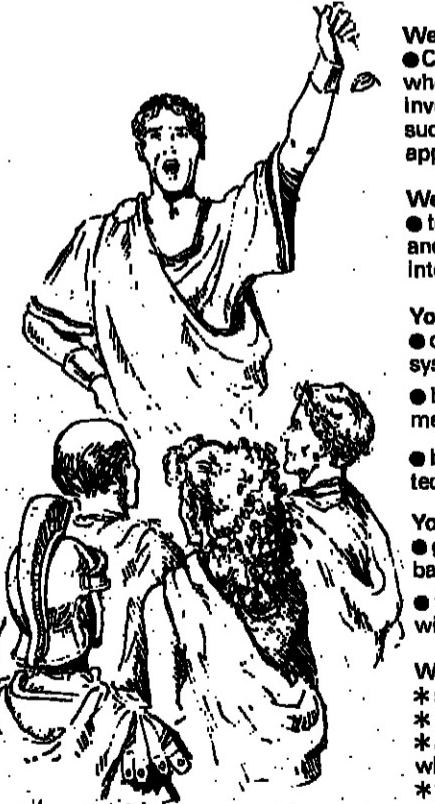
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• first class communication skills, and ideally instructing experience, with a strong desire to teach.

We offer:

• salary around £7,000.

• excellent benefits package.

• assistance with relocation expenses to the Hemel Hempstead area, where appropriate.

• first class career prospects.

Interested? Then please contact Jill McDavitt, Personnel Manager, CTL, Eaton Road, Hemel Hempstead, Herts. Tel: Hemel Hempstead (0442) 3272.

When you say  
**"COMPUTERS"**  
do people  
lend you their ears?

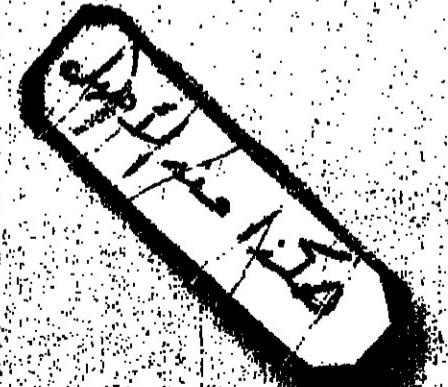
**CTL** Computers Communicate

THIS ADVERTISEMENT  
APPEARS BY VERY  
SPECIAL REQUEST.

Everything, in fact, in Computer Weekly appears by very special request . . . because copies of this weeks issue are personally asked for by 90,841 key computer personnel: a requesting readership 40% higher than that of any other computer journal. Yet to advertise to this vast, committed audience costs LESS. (£10 per single column centimetre. Nearest competitor: £12.) What's more, you can advertise here faster. Our copy date (12.00 hrs. Tuesday) is more than 24 hours later than our nearest competitors.

Speed . . . cost . . . audience. An ad in these columns wins on all these counts — and many others. Request Brian Durrant on 01-261 8000 or 01-261 8028/8658 to tell you more.

**COMPUTER WEEKLY**



## SENIOR SYSTEMS PROGRAMMER £6,500 + BENEFITS

Lloyd's Register of Shipping is our Client in the City of London, who seeks to increase their staff in order to:-

1. Assist in generation and maintenance of the Operating System
2. Advise users on the Operating System and help solve complex technical problems
3. Write and document interface software
4. Install and maintain software packages
5. Support use of compilers
6. Support and assist — operations and feasibility studies

For this you will need at least 2 years' experience of IBM Assembler with OS/VS 2 Release 1 or 2. Additionally, you will need some practical knowledge of some of the following:- TELEPROCESSING APL HASP DATABASE SYSGEN

TELEPHONE: GUY BARNARD  
01-839 6087

BARNARD, DAVIES & WARD LTD.  
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## ..Ludbrook.. SOFTWARE OPPORTUNITIES

### PROGRAMMER/ CONSULTANTS

Cobol exp.  
SYSTEMS ANALYST  
2 yrs. Systems exp.

SYSTEMS ANALYST  
Stock Control - 2 yrs. min. exp.

SYSTEMS ANALYST  
3 yrs. Systems exp.

SYSTEMS ANALYST  
DEC PDP II. 2-3 yrs. System exp.

REAL TIME PROGRAMMERS  
Outstanding opportunities for  
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SYSTEMS PROGRAMMER  
Cobol experience pref.

SYSTEMS PROGRAMMER  
BAL, PLI exp. - 18 months

RPG II PROGRAMMERS  
12 months min. exp.

PROGRAMMERS  
Cobol exp. all levels

£neg.  
Midlands  
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Leics.

£6.2K  
Essex  
£6.5K  
Peterborough

£6.6K  
Notts.  
£neg.  
London  
S/Eng.

£6.6K  
Midlands  
£neg.  
Manchester

£5.5K  
Staffs.  
£6.5K  
E. Mids.  
£4.5K +  
E. Mids.

For details of these and many other posts  
please contact in the strictest confidence:

P. Bell  
LUDBROOK MANAGEMENT SERVICES  
Recruitment Consultants  
1 Gallowtree Gate, LEICESTER.  
Telephone Leicester (0533) 52314.

### National Coal Board Mining Research and Development Establishment

The expanding programme of the Establishment covers research, development and testing in all fields of science, technology and operational techniques applicable to coal mining. This year the Establishment is recruiting scientists and engineers to increase its effort in key areas of mine productivity and safety.

There are a number of new posts for

## COMPUTER SYSTEMS ENGINEERS

MINOS is the standard colliery process control mini-computer system developed at MRDE. Work is in progress to develop a range of applications at collieries in conjunction with a number of systems suppliers.

Vacancies are available for engineers with particular interest in the following fields: software standards and production; safety aspects; application development; system maintenance; multicomputer system development; compilers and operating systems; communications aspects; documentation and information systems.

Applicants should have a degree in computer science or in an engineering or science subject and have practical experience of program development in process control systems for industrial applications; experience of RSX11 and CORAL 66 would be an advantage.

The starting salary for these posts will be according to qualifications and experience in the range £3,800 - £6,500. Excellent benefits include nearly 6 weeks annual holiday.

Please apply to the Staff and Administration Manager, quoting reference no 750.

National Coal Board,  
Mining Research and Development Establishment,  
Ashby Road, Stanhope Bretby, BURTON ON TRENT,  
Staffs, DE15 0QD.



MINING RESEARCH  
AND DEVELOPMENT  
ESTABLISHMENT

INNER LONDON EDUCATION  
AUTHORITY  
LONDON COLLEGE OF PRINTING  
SCHOOL OF SCIENCE  
AND TECHNOLOGY  
SENIOR LECTURER IN  
COMPUTER  
TECHNOLOGY AND  
INFORMATION SYSTEMS

The Senior Lecturer is required from 1st September, 1978, to take up a post in the Department of Computer Technology and Information Systems in the College.

This is a particularly challenging post to a highly motivated and enthusiastic, bold, to be responsible for computing throughout the College and to identify and expand these activities to meet the needs of work based computing if applicable.

The successful candidate should ideally be a graduate in Computer Science and a member of the British Computer Society and will be capable of teaching within Honours Degree programmes and furthering research interests in the field.

Appropriate industrial experience would be advantageous.

Salary in accordance with Burnham F.E. Reward Scale 1977-78, plus £200 Inner London Allowance.

Further details of the post and an application form, returnable within 14 days may be obtained from the Senior Lecturer, London College of Printing, Elephant and Castle, London SE1 6SE. Tel. 733 8484 (Ext. 227).

Applications are invited for the post of Research Fellow in the Personal Social Services Research Unit with effect from 1st October, 1978 or as soon as possible thereafter. The appointment will be for one year, renewable by mutual agreement. The successful applicant will be required to work closely with the funding body the DHSS and the successful applicant will be encouraged to apply for any longer term post which will eventually arise from a new contract.

The Research Fellow will be responsible to the Director of the Unit, Professor B. P. Davies. He/she will be expected to participate in data analysis as well as assisting the Director in the design, development and implementation of systems for computer handling in all the activities of the Unit including new and special surveys and projects.

Salary according to qualifications and experience will be within Range 1A or 1B of the Research and Analogous Staff scale C3085-C7760.

Application forms and further particulars may be obtained from Mr. V. Price, Senior Assistant Registrar, The University, Canterbury, Kent. Completed applications (one copy) should be returned not later than Friday, 13th October, 1978. Please quote reference A33/78. Informal enquiries should be made to Professor B. P. Davies.

## NEXT WEEK NORTHERN RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on September 21 and will highlight career opportunities in the North.

Space reservations should be made as soon as possible to:

Owen Kelly — Manchester — 061-872 4211  
Eddie Farrell — London — 01-261 8097

Copy Deadline: PM Friday before

## COMPUTER WEEKLY

THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER



SALES AND SOFTWARE SUPPORT - UK/EUROPE

## Pix Success in Europe creates new key jobs with EMI Data Communications

### SOFTWARE SUPPORT ENGINEER

Based in U.K. but able to travel throughout Europe. Directly responsible to the Product Manager.

Applicants must have 2-3 years IBM System Programming experience with in-depth knowledge of operating systems and TP monitors/handlers.

### SALES CONSULTANTS

Front line selling of PIX systems. Vacancies in the U.K., France, Benelux, Germany and Scandinavia.

Applications are invited from people with proven sales success who have a working knowledge of IBM teleprocessing concepts. Successful applicants will be expected to be locally resident. Only the best need apply.

Please apply giving brief personal and career details to:

S.J. Keat, Director SE Labs (EMI) Ltd.,  
EMI Technology (Data Communications Division),  
Spur Road, Feltham,  
Middlesex, TW14 0TD, England. Tel. 01-890 1477.

**EMI** A member of the EMI group.  
International leaders in music, electronics and leisure.

## NEW INSTALLATION

SOUTH  
YORKS

## DATABASE SYSTEMS DESIGNER

A medium-sized manufacturing Company is currently recruiting a small programming/systems design team to be headed by a Database Systems Designer, reporting directly to the D.P. Manager. He will play a leading role in developing advanced systems from conception to implementation. The system will be based on a large configuration of the Data General Eclipse C330 mini computer using an advanced operating and file management system.

The qualifications required for this position are as follows:

- ★ experience of Project Leadership and design in a real time environment
- ★ Database knowledge, gained within a mini computer environment
- ★ preferably be educated to Degree/HND level.

In keeping with the importance of this position a substantial salary will be offered in order to attract applicants of the highest calibre and background. The Company is located in low cost housing area of Yorkshire with excellent communications and close to rural parts. Normal large Company benefits apply to this position including; a low cost contributory pension scheme, subsidised canteen, and relocation expenses where applicable.

Ref. No. CW/9/2

## SPECIALIST COMPUTER RECRUITMENT LIMITED



BIRMINGHAM 021-236 3781  
Freepost, Equity and Law House,  
35-37 Great Charles Street Queensway, Birmingham B32 8BR  
MANCHESTER 061-833 0427  
Freepost, Blackfriars House, The Parsonage, Manchester M13 8BB  
LONDON 01-935 0671  
Freepost, 102, Blandford Street,  
London W1E 1JZ



Computing  
Services  
Association

UNIVERSITY OF KENT AT CANTERBURY  
FACULTY OF SOCIAL SCIENCES  
PERSONAL SOCIAL SERVICES RESEARCH UNIT

## Systems Software Programmers- Germany.

Our parent company in Germany is looking for young professionals with the right background of administrative training and with several years experience in programming, particularly of assembler type language.

The successful applicants will be self-motivated so as to plan and initiate software projects with adherence to strict time-schedules. Projects will include systems for printing and visual display text processors and for accounting systems in the middle range of data processors with particular attention to order processing, materials handling and accounting applications. The work is essentially market orientated and will include travel in Germany and throughout Europe to introduce new standard software packages and to give sales and technical support.

The post is based in Wilhelmshaven, West Germany, and salary and conditions will be of a high order. Knowledge of the German language is not essential but would be of advantage.

Applications should be sent in writing to:  
A E Perry FCA, Olympia Business Machines Co Ltd,  
203/205 Old Marylebone Road, London NW1 5QS.

**Olympia**   
Better Business Machines

## TIME TO RELAX!!

Summer in our Company is Unique. For two entire weeks the Computer Department transfers officially, to the Stewards Enclosure and does fundamental research on:

- (1) How a glass of Pimms converts old men into young boys, complete with school Blazer!
- (2) The effect of a given amount of this Unique Youth Drug on the performance of Computer Dept.

The effect can be truly amazing. This year, for instance, a thoroughly youthful and naive DPM that was obtained from a CCP, the Stewards Enclosure and the Computer Dept. was converted from an IBM 3-18 to a 370-125 was SIMPLE!

Hence this Autumn we urgently need an assistant DPM who has a thorough knowledge of low end 370 machines and at least a working knowledge of 3-18's under CCP. The rewards are tremendous (Ascot, Henley and Michael Parkinson's local cricket team) and the pay is not bad either!

If you believe you have the management skills, the experience, the drive and dedication necessary to ensure the successful completion of a project of this nature, then contact us now.

P. J. Cooper, General Manager, CWS Computer Group, New Century House, Manchester, M60 4ES  
TEL: 061-845 1212 ext. 6620 (office hours)  
061-845 7788 (evenings)

Please ring our consultants

KEY COMPUTER PERSONNEL  
01-445 3160

## COMPUTER SERVICES.. CWS Computer Group

## Project Manager

1900/2900  
Operations

Manchester based  
up to £9000

CWS Computer Group operates a network of

ICL mainframe computers, at the centre of which is currently a 2 x 2960 installation, to be replaced in late 1979 by a 2 x 2960's.

We wish to appoint a manager with extensive operational experience to take overall project responsibility for the planning, installation and transition from 1900 to 2900, both hardware and software projects.

He/she will have full project authority reporting directly to the General Manager, CWS Computer Group. On completion of this project assignment the manager will be appointed to another line management position within the Group.

Applicants with direct experience of either transition/conversion to 2900 or conversion from one manufacturer's equipment to another and a proven record of management achievement would be best qualified for this exciting and demanding job.

If you believe you have the management skills, the experience, the drive and dedication necessary to ensure the successful completion of a project of this nature, then contact us now.

P. J. Cooper, General Manager, CWS Computer Group, New Century House, Manchester, M60 4ES  
TEL: 061-845 1212 ext. 6620 (office hours)  
061-845 7788 (evenings)

# OPPORTUNITIES IN SALES MANAGEMENT

London and Birmingham  
Mini Computer Industry  
Commercial/Financial Sectors

Basic Salaries to £8,000  
Full 12 months guarantees  
Company Car or Allowance  
Usual expenses and fringe benefits

We are to identify suitable applicants to fill key positions with a leading manufacturer. Applications are invited from established managers or senior sales executives ready for management. Full job details are available and interested applicants should telephone to arrange a mutually convenient appointment.

**CONTACT BOB BOWER, ADVISING DIRECTOR**  
Ref. CW/28/1

HUTTON EXECUTIVE SELECTION LTD.  
HUTTON HOUSE,  
HUTTON STREET, LONDON EC4Y 8HP.  
TELEPHONE: 01-353 7141 (24 HOURS)

**Hutton**  
SPECIALIST RECRUITMENT CONSULTANTS

# CONSULTANCY

London Based  
To £11,000  
Implementation  
Manager/Estimator  
Computer Systems

Our Clients are a leading international computer consultancy. They are seeking a senior DP executive with a wide variety of experience in the industry covering mainframe/mini/micro manufacturers and considerable programming, analysis and management experience. A major factor is the ability to cost and estimate manpower resources and computer systems' implementations.

Brief candidate profile:

- ★ 30-40 years old
- ★ Graduate (either numerate subject or computer sciences)
- ★ Willing to travel abroad for short stays
- ★ Creative with excellent communicative abilities
- ★ Good technical background
- ★ Breadth of experience particularly in costing and estimating

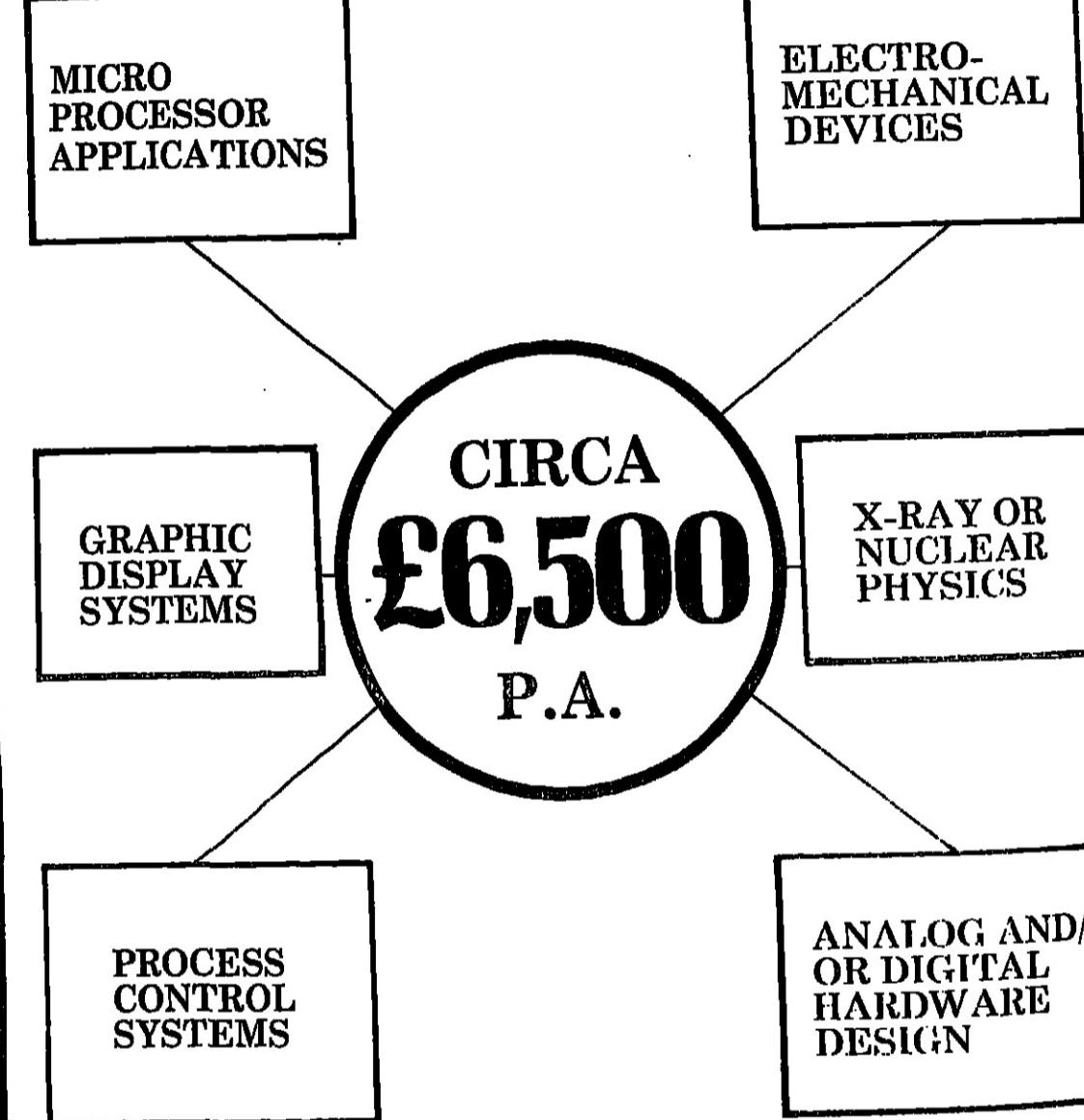
Full job specification is available at interview and interested candidates should contact BOB BOWER, ADVISING DIRECTOR.

HUTTON EXECUTIVE SELECTION LTD.  
HUTTON HOUSE,  
HUTTON STREET, LONDON EC4Y 8HR

Ref. CW/29/2

**Hutton**  
SPECIALIST RECRUITMENT CONSULTANTS

# SYSTEMS ENGINEER



To be involved in defining requirements for a new generation of medical imaging equipment.

If you have a wide physics or engineering background with special expertise in any of the above areas, this could be for you.

Our client, based in South East England, offers total systems involvement within a wide range of disciplines in a creative environment working to exacting professional standards.

For further information on this interesting and unique career opportunity contact Mark Irens now.

HUTTON EXECUTIVE SELECTION LTD.  
HUTTON HOUSE,  
HUTTON STREET, LONDON EC4Y 8HR

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## JUNIOR PROGRAMMERS

£3,000 to £4,300

S.E. ENGLAND  
You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them.

CW 37/1 Tricia

## PROGRAMMERS AND ANALYST PROGRAMMERS

£3900 to £7400

LONDON, HOME COUNTIES AND MANCHESTER  
We are inundated with COBOL, ASSEMBLER and PL/I vacancies. If you have more than one year's experience, why not ring now for a confidential chat? After 8 years in the business we really know the market place.

CW 37/2 Michael

## PROJECT LEADER £8,000

S.E. LONDON  
A small but famous International Bank requires a mature applicant to take charge of a small team dealing with banking systems re Payment Transfer and Foreign Exchange, so DEC RSXII and supervisory transfer is a must. Perks are excellent, including free meals and low rate mortgage payments.

CW 37/3 Michael

## SENIOR CONSULTANTS £8,500-£12,000

CENTRAL LONDON  
Six large, well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or ICL latest ranges are essential. Excellent fringe benefits and prospects.

CW 37/4 Michael

## OPERATOR/SHIFT LEADER £4,000 to £5,400 inc.

N/R FELTHAM  
A major chemical organisation is looking for a number of qualified operational staff with good IBM JCL and OS experience. Excellent perks available. Subsidised canteen, C.P.S., 4 weeks' holidays plus yearly bonuses.

CW 37/5 Tricia

## FREELANCE PROGRAMMERS To £260 p.w.

ICL COBOL GII  
ICL Sys/4 Uicode  
ICL Systems Analyst  
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ICL 2804 An/Prog.

City Liverpool 3 months  
S.W. London Fluent French-Luxembourg 3 months  
Bank in Nigeria 6 months

CW 37/11 Michael

Apply NOW for the latest vacancies IBM, HONEYWELL, DEC & ICL programmers welcome. Earn a Xmas holiday pay break plus an attendance BONUS. Ask for the Contracts Officer on 01-995 4148 Irene.

CW 37/12 Michael

RECRUITMENT CONSULTANTS

Universal Computer Associates Ltd., Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick, W.4.

## SYSTEMS ANALYST/SNR S/A

£6,300 to £8,200

N R ILFORD  
Our clients are a famous clothing manufacturers with a major investment in D.P. Their H6000 computer is expanding and there is an urgent requirement for 2 Business Analysts who really know how to advise new departments on new systems developments.

CW 37/9 Michael

## TIME SHARING PROGRAMMERS To £6,800

C. LONDON  
If you have had time sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four nationally known companies who would offer you an exciting job in pre or post sales support. Some offer generous bonus schemes.

CW 37/10 Michael

## MINI COMPUTER PROGRAMMERS £4,000 to £8,250

LONDON & HOME COUNTIES  
If you have experience in ASSEMBLER or micro-code or communications for at least 1½ years then a whole exciting field is open to you. We now have opportunities in S.W., N.W. or W. London, Surrey, Berkshire and Hertfordshire for computer people in this rewarding field. The future is definitely going to be with the MINI-computer professional. Telephone for details.

CW 37/11 Michael

## MINI SALES ENGINEER £8,000 + CAR + COMMISSION

MIDLANDS AND LONDON BASED  
Two major mini manufacturers require experienced salesmen with real-time or process control sales experience. These firms are going places so join now. Quota earnings up to 13% in first year plus excellent perks.

CW 37/12 Michael

We'll give you a new mini, and half a million.



\*NORTH LONDON\*5 WEEKS HOLIDAY  
\*OVERTIME PAYMENT SCHEME\*SUBSIDISED RESTAURANT\*ON-LINE DEVELOPMENT FACILITIES\*EXCITING NEW PROJECTS & HARDWARE\*GENEROUS RELOCATION PACKAGE.

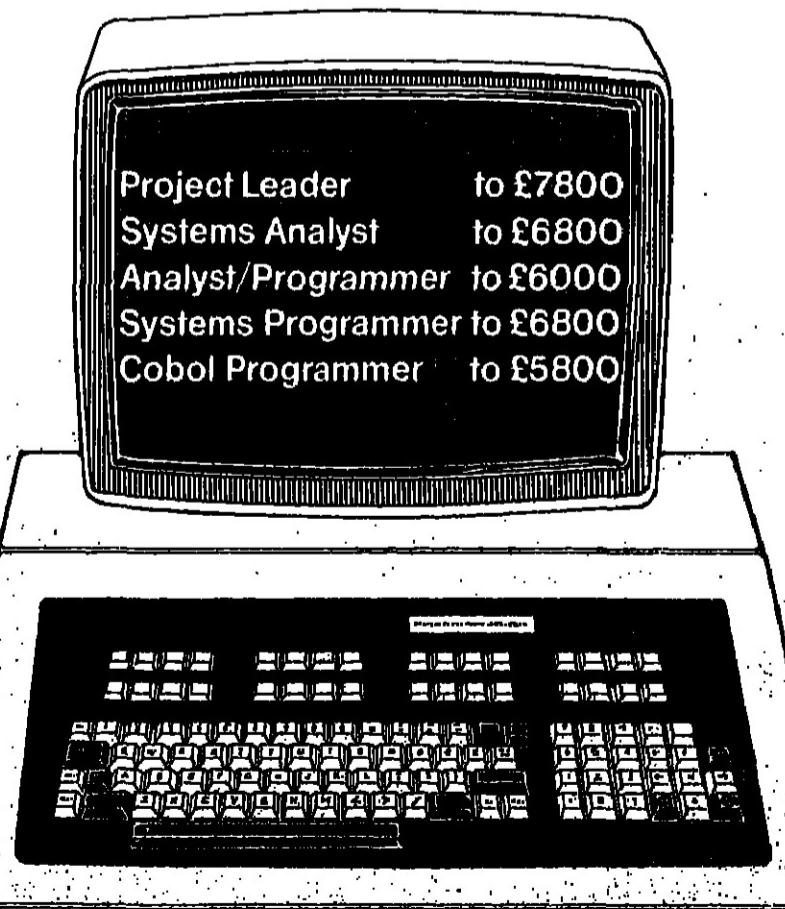
The mini, a powerful 1/4 million byte Interdata 8/32 will be linked locally to an IBM 370/138 to provide a configuration with exceptional batch/TP capability. This will support advanced new marketing, manufacturing, and financial systems to be developed to professional standards using TOTAL data base and a VDU network.

Our clients are a major manufacturing company and market leaders in their field with a successful history of growth and profitability. They employ over 4,000 people with a turnover in the region of £40m.

If you have the necessary talent for these exciting new projects, then we would like to hear from you. Experience on the hardware is not essential as any necessary training will be given.

Please send brief details to Position No. AKW6974 or telephone Neil Beckingham at Austin Knight Ltd., London W1A 1DS, Telephone 01-439 8681.

Applications are forwarded to the client concerned, therefore companies in which you are not interested should be listed in a covering letter to the Position Number Supervisor.



These positions are open to both men and women.

## Austin Knight Ltd.

20 Soho Square, London W1A 1DS  
Telephone 01-439 8681



Computing

**PROJECT LEADER**

PO1C £9813-£7230 p.a. Inclusive of supplements

To be responsible for one of three teams of analysts and programmers and reporting to the Development Manager. Candidates will have drive, initiative and the ability to motivate their team in addition to a high level of expertise in systems analysis and design.

**SYSTEMS ANALYST**

PO1A £8727-£6343 p.a. Inclusive of supplements

As next in seniority to the Project Leader candidate should have designed and implemented computer systems. Applicants with a programming background and knowledge of systems processes will also be considered.

**SENIOR PROGRAMMER**

APV/BO1 £4248-£3688 Inclusive of supplements

Applicants should be ICL 1900 series Cobol programmers preferably with Generic 3 or communications experience. The successful candidate will work in a small development team and be expected to assist with the supervision of more junior programmers.

**TRAINEE PROGRAMMER**

Up to £3681 p.a. Inclusive of supplements

Applicants must have a sound academic background. Appropriate training in Cobol will be given if necessary.

The starting salary paid in all cases will depend on qualifications and experience. The Computer Centre is located in the heart of the city at 1286 ICL 1900 running under Generic 3, to which further extensions are planned.

There is an ambitious development plan which includes development in database techniques and VDU based systems.

Full-time working operators and assistance with relocation expenses will be given in appropriate cases. Please telephone for a job description and application form (to be returned by 28th September), to the Chief Personnel Officer, Mercon House, Mercon Way, Ashton-under-Lyne, Greater Manchester. Tel: 061 530 0385 Ext. 2.

**ANALYSTS PROGRAMMERS OPERATORS****ANALYSTS & PROGRAMMERS LEEDS £4500 to £7000**

IBMs and Large Minis for Time Sharing and On-Line development. (Peter)

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Female or Male, In-House Min. (David)

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Installation Software Support. Byte based experience please. (Peter)

**SCIENTIFIC/TECHNICAL PROGRAMMERS SOUTH COAST c. £5500**

Mini Assembler or Fortran, Process Control, Real Time, Simulation. Opportunity for foreign travel. (David)

**PROJECT LEADER SOUTH MIDDX. to £7500**

Project Leading and Business/Financial experience. (Peter)

**SENIOR PROGRAMMERS LONDON W2 to £6000**

ICL Cobol for On-Line Text Processing. (David)

**OPERATORS SOUTH MIDDX. £3600 to £5400 incl. (Peter)**

From 2 months' exp. to 2 years OS/VSI at top end. (Peter)

**COBOL PROGRAMMERS SOUTH MIDDX. c. £4850**

1 year plus any Cobol for On-Line installation. (David)

**COBOL PROGRAMMER WEST END to £6000**

Come and learn more about T/P and Databases. (Peter)

**ANALYSTS OR ANALYST/PROGRAMMERS ESSEX BORDER c. £6400**

M.I.S. development work. Relocation. (David)

TELEPHONE: 01-839 6087

Peter Barson (Even. &amp; Weekend 0702-521621) Computer Personnel Consultants

107 Jermyn Street, London, SW1Y 6EE

DAVIES &amp; WARD LTD

**ASSISTANT TO COMPUTER OPERATING SUPERVISOR**

c. £4000

Due to implement a position has arisen in the In-House Computer Department of our new H.Q. building administration office for an experienced Computer Operator to assist the Computer Operating Supervisor.

The successful applicant aged 22 or over will have had one year's dot experience including handling NIXDORF equipment and will have a responsible attitude to his/her work.

Working on an installation on line NIXDORF PDP11 and DATAPOINT Equipment, the main function will be to correctly process daily work schedules as supplied.

Basic hours of duty will be from 12 noon to 8 p.m. Monday to Friday, which will require an ability to work on own initiative.

As well as a good starting salary, we offer excellent working conditions, pension, life assurance, discount schemes, an excellent subsidised staff restaurant and a planned first class social club.

For application form please apply Mrs. S. Parker CHARRINGTON &amp; COMPANY LIMITED Anchor House Miles End Road, London, E1 4BL Telephone: 01-790 1860



Charrington

**TEMPORARY COMPUTER PROGRAMMER**

Up to £5,253 p.a. (full-time)

Experienced programmer with practical knowledge of PL/I, COBOL and I.C.L. Software, required (preferably full-time) to cover approximately one year's absence on maternity leave. Complete artwork is supplied 12 noon on a Tuesday.

Ring Ian Carter for further details on 01-261 8016

BOROUGH OF BROXBOURNE

**FIELD SERVICE ENGINEERS**

NEW CAREER START c. £5,500

(Plus overtime + standby allow. + car + training)

One of the World's leading Micro/Mini Computer manufacturers are about to establish a new branch office — this could be your chance to get ahead with prestige products with worldwide acclaim — they offer a generous starting salary + car + bonus and other benefits. If you are a bright Young Service / Customer Engineer with good academic background / electronics experience and living in London or Home Counties, then take a big stride forward to an exciting new career with excellent future prospects by calling today ... but hurry!

Ref: EK 2066 (Consultants).

AB EXECUTIVE (KINGSTON) LTD, 01-546 9473

**Analyst/Programmer**  
**Real-Time Applications**

This position offers you the chance to be involved in the introduction of on-line systems from the very start. Located in Leicester this independent brewery is expanding its varied computer applications and you will be a key figure in their development.

Probably aged in your mid-20's you should have worthwhile Cobol Programming experience on 1900/2800 machines. Real-time experience is highly desirable as is experience of implementing on-line systems, preferably on a 2903/4. The conditions of employment are excellent and the department being only a small one at present will give you every chance to be widely involved in its activities. Your salary will be related to relevant experience but could range from c £4,500 to c £6,000.

**PER**  
Professional & Executive Recruitment

Contact: Christine Phillips, PER  
177 Charles Street, Leicester  
Tel: (0533) 536321

Applications from both men and women are welcome.



(A member of the Unilever Group of Companies)

**OPERATIONS MANAGER**

to £8,400

Applications are invited for the above position. Requirements include knowledge of OS JCL, staff supervisory experience and a general understanding of how the operations function interacts within the computer department.

Duties include management of the terminal operations team, ensuring that live applications run to schedule, and control of application packages. In addition, a significant degree of user contact is anticipated regarding operations systems and ad hoc requirements.

This position would appeal to people wishing to develop their career within operations and who would welcome a broad involvement in this department's activities.

Current computer systems are run via a network of remote batch terminals linked to IBM/ITEL mainframes at the Group's computer centre.

Facilities include: staff shop, canteen, sports and social club.

Please give brief details of experience age, etc. to:

Mr. B. E. Oakley, Computer Services Manager

The Walls Meat Company Ltd

**FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY****COMPUTER ENGINEERS U.K. - O.S.**Field/Site/Sector:  
All sectors per  
c. £4,500-£14,000 p.a.

Stand by:

Overtime:

Recorded to post:

24 hour answer phone:

100% VAT free

# Analytical Programmers

**Increase your earnings and secure your future with CMG!**

## PLUS

- \* **Free Life Assurance & Pension Plan**
- \* **BUPA Family Cover**
- \* **21-26 days annual holiday**
- \* **Profit sharing**
- \* **Holiday commitments honoured**
- \* **Removal expenses paid**

Experienced computer professionals are required at all levels within CMG.

If you are earning between

**£4000 - £12000**

and want to develop your career with a company committed to growth, complete the attached application form and send it to one of the CMG Subsidiaries shown below.

Jane Leiper,  
CMG Computer Management  
Group (Middlesex) Ltd.,  
Westway House, 320 Ruislip Road East,  
Greenford, Middlesex UB6 9BW  
Tel: 01-578 4563

Janet Stirling,  
CMG (Scotland) Ltd.,  
Highland House, 58 Waterloo Street,  
Glasgow G2 7DA Tel: 041-221 8193/6

Judy Wilson,  
CMG (Southern) Ltd.,  
Sunley House, Bedford Park,  
Croydon CR0 2AP Tel: 01-686 8251

Janet Gothard,  
CMG (West End) Ltd.,  
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FIRST NAMES

ADDRESS

TELEPHONE Nos. HOME

OFFICE/CONTACT

DATE OF BIRTH

MARITAL STATUS

NATIONALITY

DO YOU HAVE A CURRENT DRIVING LICENCE?

PASSPORT?

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ARE YOU PREPARED TO TRAVEL FOR SHORT PERIODS

UK? ABROAD?

DESCRIBE THE APPOINTMENT YOU NOW SEEK:

### DETAILS OF EDUCATION

SCHOOL CAREER

EXAMINATION RESULTS (subjects and dates)

HIGHER EDUCATION

EXAMINATION RESULTS (courses and dates)

### CAREER HISTORY

PRESENT OR MOST RECENT EMPLOYMENT

NAME OF COMPANY

JOINING DATE

JOINING SALARY £

CURRENT SALARY £

POSITIONS HELD (approx. dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

PREVIOUS EMPLOYMENT

NAME OF COMPANY

JOINING DATE

JOINING SALARY £

CURRENT SALARY £

POSITIONS HELD (approx. dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

PREVIOUS EMPLOYMENT

NAME OF COMPANY

JOINING DATE

JOINING SALARY £

CURRENT SALARY £

POSITIONS HELD (approx. dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

### OTHER INFORMATION -

LEISURE, COMMUNITY ACTIVITIES, etc:

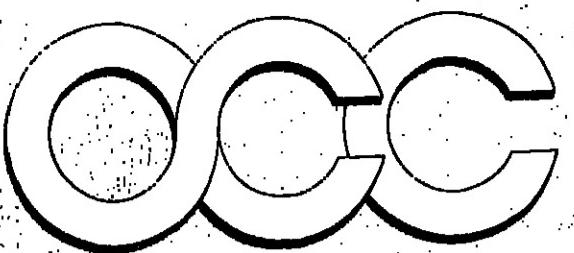
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### Euston

#### Senior Systems Analyst

c £7,500

Large-scale accounting systems

The computer serves the needs of a major public body which handles significant amounts of money, and the accounting systems handle a large volume of accounts and transactions. However, the department is still young and there are plans to design and implement further large systems. New hardware will be required in the future and modern techniques (data base and on-line systems) will be used. A Senior Analyst is required to help with the investigation, design, specification and implementation of new systems. The Analyst will have considerable autonomy and must be stable, self-motivated and mature to allow him to operate at the most senior levels. Experience of accounting systems, database and on-line techniques would be useful. The hardware background is unimportant. Prospects for career development are excellent and the terms of employment are very good. They include relocation expenses, index linked pension scheme, season ticket loans, etc.

Ref: 741/CW/Neville John.

### London Bridge

#### Senior Systems Analyst

to £7,000

#### Senior Programmer

c £5,500

New 2004: development of accounting system

A leading manufacturing and publishing group needs a Senior Analyst to deal with an increased workload. The ICL 1902A is to be replaced by a 2004 later this month. The analyst will develop a major accounting package and will lead a small but growing team of programmers working on both batch and on-line commercial systems. The prospect of project leadership is likely in the near future. Candidates should have at least three years' commercial systems experience and a Cobol programming background. A Senior Programmer with at least two years' Cobol experience, any hardware, is also required. Benefits include flexible working hours, a subsidised restaurant, season ticket loans, staff discounts, and for the analyst a car loan scheme.

Ref: 743/CW/Marian Tabone.

To apply for any of the above positions or for further information, please telephone the Consultant concerned during working hours on 01-242 9366, or write to the above address.

If it would be more convenient to telephone in the evening, or weekend, the telephone numbers are: Roger Allington — Berkhamsted (04427) 2299, Neville John — Farnborough (66) 52880, Marian Tabone — 01-565 5568.

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In line with current expansion plans we will be pleased to hear from programmers, analysts and consultants of professional disposition with a solid background in any of the following disciplines:

**MARK IV COBOL PL/1 BAL**

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Forthcoming internal projects include developments on in-house equipment. Current external projects cover U.K., Europe, U.S.A. and the Middle East.

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Programmers

\$ negotiable

H6000 Series COBOL

A number of opportunities currently exist for COBOL programmers with Honeywell 6000 series experience to work on contract in the USA. Application areas, utilising IDS, include Accounting and Materials Management. Candidates for the senior positions should have a total of 6 years' DP experience including around 2 years on large Honeywell hardware, preferably together with some system and program design experience in the commercial accounting area. Programmers should have around 4 years' experience including some time spent on Honeywell equipment. In both cases experience of IDS, TDS, TSS or GMAP could be very useful. Employment will be offered on a renegotiable short or long term contract basis and fringe benefits include paid air fares, sickness scheme, bonus, tax concessions, relocation expenses, etc. Working conditions are excellent. Offices are air-conditioned and the general environment is relaxed and friendly with a wide variety of sports and recreational facilities available in the area.

Ref: 380P/CW/Roger Allington.

### Middle East

#### Analyst Programmers

c £14,000 tax-free + benefits

New department: IBM 370/115; RPGII; CICS; DOS/VS

Analyst programmers are required for a new computer department being established at a leading motor distributor in Saudi Arabia, which is due to take delivery of an IBM 370/115 in March, 1979. The system will initially be a mixture of batch and on-line, running under CICS and DOS/VS and written in RPGII. Successful candidates will ideally have at least 18 months' practical experience of CICS, DOS/VS and RPG. There will be a high degree of user involvement and the positions will suit self-starters. Experience of the distributive side of the motor trade would be an added advantage. These positions are on bachelor status, enjoying the following benefits: 30 days' leave and 15 days' public holidays per annum. Free furnished accommodation of good standard with free electricity and water. Free medical treatment and company car.

Ref: 739/CW/Marian Tabone.

To apply for any of the above positions or for further information, please telephone the Consultant concerned during working hours on 01-242 9366, or write to the above address.

If it would be more convenient to telephone in the evening, or weekend, the telephone numbers are: Roger Allington — Berkhamsted (04427) 2299, Neville John — Farnborough (66) 52880, Marian Tabone — 01-565 5568.

Members of Computing Services Association

### SYSTEMS ANALYST

Expanding Canadian construction company requires a systems analyst with flair and resourcefulness to be personal assistant to the data processing manager.

Applicants must have a degree or equivalent and from 3-5 years' experience in business systems and programming. Interviews will be held in the U.K.

The configuration is a P.D.P. 11/70 using R.S.T.S./E. with programming in Basic-Plus. Existing on-line applications include estimating, costing and payroll. The successful candidate will design an on-line sales/invoicing system initially, then moving on to estimating and accounting. The position involves considerable independence and responsibility and will require some travelling to our Calgary and Vancouver branches. The job is located in our new premises in Edmonton.

Starting salary is from £19,000-£22,000 depending on qualifications.

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Sunbury-on-Thames  
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Any machine experience

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**MARCOL COMPUTER SERVICES**

## CAREER DEVELOPMENT FOR ANALYSTS AND PROGRAMMERS

Leicester

There are a number of vacancies at our Leicester based client for professional data processing staff. The installation employs the latest ICL hardware and current developments include database and on-line systems covering a diverse range of applications. Distributed processing applications using mini computers are also being developed.

Applications are invited for the following positions:-

**Analysts c.£5500**

Reporting to a project leader these positions offer good experience in development of major systems.

Candidates should have one or two years systems analysis experience and preferably a background in programming.

(c/78084)

**Junior Analysts c.£4700**

These vacancies are within project teams and can offer candidates excellent prospects as 'first time' analysts.

Candidates should have about three years relevant dp experience preferably including some supervisory role.

(c/78085)

**Senior Programmers c.£5500**

These positions involve responsibility for leading a small programming team developing new systems in a project environment. The positions report to the chief programmer.

Candidates should have about three years COBOL experience in a major installation.

(c/78083)

Telephone or write giving brief career details, quoting appropriate reference, to Ivor Norton.  
OR ALTERNATIVELY INFORMAL INTERVIEWS WILL BE HELD AT THE CENTRE HOTEL, LEICESTER FROM 9.00 a.m. UNTIL 9.00 p.m. ON THURSDAY 21st SEPTEMBER 1978. YOU CAN MAKE A PRIOR APPOINTMENT FOR THIS DATE OR ALTERNATIVELY DROP IN AND SEE US WHEN CONVENIENT.

## Ivor Norton Management Services Ltd

Recruitment Consulting Division

P.O. Box 63, Copthall Tower House, Harrogate HG1 1TS. Tel: Harrogate 66628.

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and a

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You will be working together as a team, but initially the entries of the various team members will be staggered over several months: the first programmer to start in October, 1978. The unit will gradually increase until it is completed by March, 1979.

To play your part as an essential member of the team, you will be expected to have experience in three or more of the following: IMS, VMS, TSO, CICS, ASSEMBLER, PL/I and FORTRAN.

If you have the skills we need, and would be happy working with a close-knit group of professionals based in the South, ring FOCUS COMPUTER SERVICES immediately on 01-487 5781.

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All classified copy should reach our offices no later than 6.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring Ian Carter for further details on 01-261 8016

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Department of Mechanical Engineering

**RESEARCH OFFICER**

FOR THE ROBOTICS GROUP

Applicants are expected to hold either a University degree or HND and have knowledge and experience of microelectronics. The successful applicant will work in a research laboratory developing robots. Main duties will be in configuring and interfacing Intel microprocessors to the robot hand and robot software. The successful applicant will be able to exploit fully ability and knowledge in developing new applications in the field of robotics. Good level language and will be able to engage in computer simulation work and control problems concerning robots.

The commencing salary will be £4385 per annum, on the Research & Analytics Staff Scale, Range 18.

The duration of the appointment is for 2 years.

It is hoped that the successful applicant will be able to commence duties on or before 1st November, 1978.

Further particulars of this post may be obtained from the Assistant Secretary (Personnel), University of Surrey, Guilford, Surrey GU2 5XH, or telephone Guilford 71281, Ext. 200. Applications, in the form of a curriculum vitae, including the names and addresses of two referees, should be submitted by 10 October, 1978.

## MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

## IBM UPGRADE IN LONDON

### COBOL & ASSEMBLER PROGRAMMERS

A SMALL DATA PROCESSING DEPARTMENT, IN CENTRAL LONDON, wishes to secure the services of three IBM PROGRAMMERS to assist with the development of mainly accounting applications and the implementation of a larger 370 to be installed in 1979. The Company is in a period of continued expansion, relying heavily on data processing systems to cope with the increase in demand for accurate accounting information.

TWO PROGRAMMERS, WITH AT LEAST 2 YEARS' IBM COBOL, are required to strengthen the systems and programming group currently engaged on several interesting projects. A knowledge of DOS/VS would be an advantage and the successful applicants will be expected to communicate with accountants and senior personnel alike. Salaries will be according to experience with a maximum of £5,800 per annum.

A SYSTEMS PROGRAMMER, WHO IS SEEKING PROMOTION TO CHIEF PROGRAMMER, will initially be fully responsible for the operating system and all programming support. Candidates will have 4-5 years IBM ASSEMBLER experience and a knowledge of COBOL will be especially helpful in securing the Chief Programmer position. Commencement salary will be up to £6,800 per annum with an extra £500 on promotion.

The Company offers a NON-CONTRIBUTORY PENSION SCHEME. 15 hours week and 4 weeks holiday. Being situated in Central London, it is easily accessible by all forms of transport from the Home Counties.

### 24-HOUR ANSWERING SERVICE

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01-623 0081

**GRUNDIG****IBM System  
3-15B**

Grundig International are the marketing subsidiary of Grundig AG, distributing quality electrical goods throughout the UK. We are undertaking a long-term project in which our conventional/computer-related systems will be streamlined, thus creating a coherent and flexible organisation to meet future market demands.

**Programmer / Analyst  
c. £6,000 p.a.**

To strengthen our development team we have created a new position for an experienced RPG2 Programmer/Analyst. He or she will be responsible to the EDP Manager for the design and full implementation of the planned systems which will include on-line inventory control/distribution and associated budgetary costing.

**Senior Computer  
Operator  
c. £5,250 + p.a.**

In order to assist in the implementation we also have a vacancy for an experienced operator to control the daily processing requirements. The successful candidates will have the initiative and self-motivation to develop the scope of the positions by introducing Company-wide systems in the area of data communications. The excellent remuneration packages will reflect the high level of contribution expected from the applicants. To discuss your ambitions and prospects with us please telephone

The Personnel Officer,  
Grundig International Limited,  
Newlands Park,  
Sydenham, SE26  
Telephone: 01-659 2468

**Computer  
Operator  
SHIRLEY, SOLIHULL**

The Region currently operates a 192K 1903T running under GEORGE 3, with two front end processors supporting a mixed batch/communications workload. A 2803 system is also installed. Future developments include the replacement of the 1903T with a large 2800 configuration.

Shift working is involved. Salary range including shift allowance £2,855-£4,499 per annum. A self-financing bonus is also payable.

If you think you have the right level of experience to join a go-ahead team, please write, quoting vacancy number CW232/78MR giving details of age and experience to the Personnel Manager, Central Electricity Generating Board, Hanbury Green Road, Shirley, Solihull, West Midlands, B90 4PD, by 21st September, 1978.

 CENTRAL ELECTRICITY  
GENERATING BOARD  
Midlands Region

**Ludbrook****RECRUITMENT CONSULTANT**

An excellent opportunity exists within our expanding D.P. division, for a dynamic male or female, who is able to communicate at all levels, with confidence.

A minimum of 18 months D.P. experience, together with a pleasing personality, and ability to work under pressure is essential.

The rewards for self motivation are high. For further details, please phone in the strictest confidence.

P. BELL  
LUDBROOK MANAGEMENT SERVICES  
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Telephone: Leicester (0533) 52314

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Leicester up to £4332

This is a key position in the Computer Operations area.

Progress and Control Assistants negotiate short-term work processing schedules with representatives from the departments using computer systems. They are responsible for preparing, submitting and progressing computer runs in line with these schedules to ensure that the required work deadlines are regularly met. They must maintain contact with both Computer Operating staff and the user representatives on the current work status. Additionally, they must make sure that the manual checks and controls built into each system are stringently enforced.

The successful man or woman must be capable of establishing and maintaining good working relationships with other staff, possess a methodical approach to work and be prepared to work outside of normal hours to ensure work is completed satisfactorily.

Salary in a range rising to £4332 per annum.

Detailed applications, quoting reference number A.201 on both letter and envelope, to: Senior Personnel Officer (Finance & General Services), EMGAS, De Montfort Street, Leicester.

Closing date: 22nd September, 1978.

**EMGAS****WEST WILTSHIRE  
DISTRICT COUNCIL****RPG 11  
PROGRAMMER/  
ANALYST**

SALARY £5,331 to £5,668 including all Supplements and Shift allowances

The Council operates an ICL 2903 computer with EDS 60s and a 7502 based communicating network providing a computer service throughout the authority.

The installation is operational between 7.30 am to 7 pm by means of two shifts, i.e. 7.30 am to 4 pm and 10.30 am to 7 pm.

The machine is due to be upgraded to 2904 in late summer and the Council wishes to appoint one experienced RPG11 Programmer wishing to gain experience in the analysis sphere. The person appointed will have at least eighteen months experience of RPG11, and a detailed knowledge of ICL 1900 to 2803 Software/Utilities will be regarded as equally important.

If you would like to discuss any aspect before submitting an application form, please contact D. BENFIELD, Computer Manager on Trowbridge (02214) 63111 ext. 121.

The West Wiltshire District Council area is situated in a pleasant rural location, with easy access to the towns of BATH/BRISTOL and the M4/M5 motorways with reasonable house prices. Removal and lodging expenses can be provided in appropriate cases.

Application forms are available from Personnel Officer, WEST WILTSHIRE DISTRICT COUNCIL, BRADLEY ROAD, TROWBRIDGE, WILTSHIRE BA14 0RD or by telephone Trowbridge (02214) 63111 ext. 119 (Mrs. Tilley). Closing date 21st September, 1978.

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The Company provides:

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Computer Ancillaries Ltd.  
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EGHAM 6455



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Our client, a highly successful company operating a rapidly expanding number of retail outlets now seeks a Data Processing / Systems Professional

Reporting to the Financial Director the position is based at the Company's Headquarters in an attractive town north of London, where current facilities are based on an ICL 2903.

The demands of this job will require a subtle blend of technical know-how and management plus effective procedures for scheduling and running existing systems particularly stock-control and payroll routines.

An ambitious corporate plan will provide exciting systems design opportunities and career development prospects which would be difficult to match.

The successful candidate will be in his or her 30s possibly with a degree or equivalent in a relevant discipline, and preferred experience in an environment where control processing is carried out by remote operating units.

The company regards the remuneration package as negotiable around an indicator of £8,000 per annum.

Please apply in writing, giving all relevant details — all applications will be acknowledged and treated in the strictest confidence, to Box No. C.W.1981.

**PROGRAMMERS  
c £5,200 + mortgage  
+ benefits**

Join the computer department of a large American Bank in Central London developing Foreign Exchange and Loan Deposit systems on their PDP 11/55. When complete these systems will be implemented in their European branches. Ideally candidates will be working for a financial organisation at the moment and have 2-3 years' programming experience using Basic, Cobol or Fortran, preferably on Minis although this is not essential.

You will receive excellent benefits including a subsidised mortgage, BUPA, Life Insurance, non contributory pension scheme, free lunches and profit sharing.

Worth considering? Then contact LINDA BENSTED on 01-875 0775.

Both the above positions are senior appointments and would expect to command salaries in excess of £7,000 p.a.

A Company Car will be provided for the Project Manager.

KEY COMPUTER PERSONNEL  
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**MANAGEMENT &  
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Extensive training on equipment will be given by the company and manufacturers, but a minimum HNC qualification must already be held by applicants.

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To join this major force in Scotland — contact Peter Gorton!

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(based London)**

**£10K +  
negotiable**

If International Support appeals, and you have a detailed knowledge of IBM 370/165 or 370/168 or 360/65, then this company can offer you an exceptional future.

Send your C.V. directly to Peter Gorton, or telephone for an application form. Further information will be available.

Basic salaries will be not less than £6,000 p.a.

**Additionally:** For Central London they provide allowances of £2,000 p.a. plus Call Out, Standby and/or Shift Payments where appropriate. For Outer London they provide a £400 London Allowance, a Company Car or Car Allowance, and a good possibility of working from home.

Free Life Assurance is included in the comprehensive benefits package, one you would expect from an expanding, international company.

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They are a young, successful and progressive organisation, a rich mix of talents that consistently produce exceptional computer systems that sell widely.

You will be joining a professional computer service team working on mini-computers and mainframes, and will receive a thorough training in both hardware and software.

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Basic salaries will be not less than £6,000 p.a.

**Additionally:** For Central London they provide allowances of £2,000 p.a. plus Call Out, Standby and/or Shift Payments where appropriate.

For Outer London they provide a £400 London Allowance, a Company Car or Car Allowance, and a good possibility of working from home.

Free Life Assurance is included in the comprehensive benefits package, one you would expect from an expanding, international company.

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## TURNKEY SYSTEMS—SYSTEMS DEVELOPMENT MANAGER NEG + BONUS

EMS has entered into a further diversification with the launching of a specialised new Data Centre based in Birmingham and handling UK Turnkey Systems Development. We now require a Senior experienced Manager capable of guiding and directing Analysis & Feasibility Studies with prospective clients to the setting of core requirements and drafting of tenders. Equally, a competent knowledge of systems programming and operating systems is sought. We envisage a successful applicant having previous experience of manpower planning and control. Ability to motivate and lead will be an important factor. Equally, we anticipate candidates having a good technical knowledge of Data Processing, with sound commercial and financial acumen. This position will be available to clients at Level 10 as well as being important to us as it will be to our clients. A salary package of between £50 and £7500 plus annual increments.

The successful Manager will play a major role in the development of our Turnkey Systems Division and must be prepared to accept the pressures and responsibilities commensurate with a high growth sector, in order to progress to the ultimate career opportunities within the company. A bonus scheme is in operation for senior management throughout the group and assessed on individual unit performance. This position represents the opportunity of joining a new division and making an early impact upon management. Experience within a consultancy or turnkey company would be advantageous. Age 30-45 preferred. Relocation assistance where appropriate. Apply initially to J. Wood, Managing Director, and return the attached form to the Newcastle office.

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**BIRMINGHAM TO £5,200**  
An engineering group with a Heavyweight Level 62 services computer urgently need an experienced Cobol Programmer. Any machine accepted to help with ongoing development and maintenance of existing systems. Candidates must be capable of working for long periods without supervision. Good knowledge of COBOL and standard of support documentation. Occasional involvement in systems development will also be available if required. Current applications include sales order processing, analysis, purchasing ledger and payroll. A small team handles all development and maintenance with external turnover assistance for any major development work.  
CONSULTANT DON PHILP TEL 021-454 7906

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CONSULTANT SUSAN ADAMS

## SYSTEMS ANALYST

**SURREY TO £7,000**  
Responsibilities will include making a technical input to many projects where a high software content is involved and in particular to enable the company to engage in projects where micro processors are a large part of the job content. The candidate elected must be highly versatile and able to work in a team environment. Previous experience in financing, Marketing, Manufacturing and Payroll. The company has IBM hardware, but will accept alternative machine experience. A minimum "A" level educational standard is preferred. Relocation assistance will be available if required. The successful candidate will be involved in a dynamic and fast growing environment. Apply initially to the HMC career form today and let us provide a whole new world of current opportunities for you within an area of your choice.  
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**BERKSHIRE TO £8,000**  
Our Client is a major bureau providing a diverse range of services to Southern clients. Preference will be for candidates with ICL 1900 or 2900 series experience using GEORGE III or VMES, COBOL, FORTRAN or PL/I language. Successful candidates will be responsible for customer training and will produce an on-call demonstration. Experience should be in the production of reports and ad-hoc mail enquiry via established clients. We envisage you using customised software and production of technical literature.  
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## ANALYSTS PROGRAMMERS & PROGRAMMERS

**LONDON SE1 TO £7,000**  
The successful applicant will undertake overall responsibility for 2-3 large systems, user communications, analysis of requirements and negotiations of new work. Equally, assistance will be expected with preparation of tenders and specification of systems. The successful DP staff will also be responsible for the preparation of user and operators documentation. The client will require you to Tenda Estimates and Cost projects in addition to undertaking occasional programme reviews.  
CONSULTANT CAROL PROUDMAN

## ANALYST/PROGRAMMERS

**SURREY TO £6,000**  
Our client requires practical knowledge of programming with at least 2 years' COBOL experience. Equally, they seek practical experience in the design and implementation of at least 2 major projects, preferably associated with the design of a new computer. Experience of ICL or Data General equipment would be advantageous. Applicants must be self motivated and capable of working in a bureau environment.  
CONSULTANT CAROL PROUDMAN

## D.P. MANAGER DESIGNATE

### THAMES VALLEY

**UP TO £7,000**

Our client, who has recently ordered an IBM System 3 Model 15 and a remote System 34, is looking for a highly professional Analyst/Programmer with a strong desire and drive to become the company's Data Processing Manager in approximately 2 years' time.

The successful applicant for this challenging and interesting position will have a proven record of successful project implementation and 2 years' experience of programming in RPG II. He or she will initially play the major role in implementing an extremely sophisticated order processing and inventory control system, with equally challenging and interesting new developments planned for the future.

The position reports directly to the European Data Processing Manager and is based in rural surroundings in the heart of the Thames Valley, but there will be a future requirement for some European travel.

Our client is offering an exceptionally attractive benefits package in addition to a starting salary of up to £7,000 per annum to the successful applicant who has or has had a long-term career in mind.

If you are interested in this first-class opportunity, please complete and return the attached application form quoting HN 1 to ring DON PHILP on 021-454 7906.

## PROGRAMMERS

**HERTS TO £6,400**  
British Rail IBM Series 30's has a large number of outstanding vacancies on numerous interesting new development projects. Experienced IBM PROGRAMMERS are urgently sought to work on large project teams. Any IMS TSO experience would be especially valuable. Don't worry, GEORGE III/COBOL will be acceptable. CONSULTANT DON PHILP TEL 021-454 7906

## ANALYSTS

**BRIGHTON TO £6,000**

Analysts are sought within the Management Services Department of a large industrial group which is involved in all computerised areas of management. Applications procedures across the group include Financing, Marketing, Manufacturing and Payroll. The company has IBM hardware, but will accept alternative machine experience. A minimum "A" level educational standard is preferred. Relocation assistance will be available if required. The successful candidate may be busier than normal and be capable of effectively representing the company in occasional client discussion.  
CONSULTANT CAROL PROUDMAN

## SYSTEMS ENGINEERS

**SOUTHERN REGION TO £7,500**

A large number of opportunities currently exist with Southern manufacturers for experienced technical programming and systems staff to work in the Aerodynamics Defence Systems and Process Control sectors. Requirements for a sound knowledge of analogue and digital computing, real time systems, data processing, FORTRAN, COBOL and a possible knowledge of simulation techniques. Particularly advantageous would be any knowledge of simulation software, a capability to train others in micro processor development or mathematical modelling. Complete the HMC career form today and let us provide a whole new world of current opportunities for you within an area of your choice.  
CONSULTANT DON PHILP TEL 021-454 7906

## 200 SYSTEMS DESIGNERS AND PROGRAMMERS

**MANCHESTER AREA TO £7,500**

Syntex Designers and Senior Designers have responsibility for the design and development of complex software systems and the integration of software modules in a distributed systems design environment. They are also expected to provide technical support to sales and users. Programmers and Senior Programmers are sought with a minimum of 3 years' experience of real time programming. Any current or previous design experience will be an advantage. A minimum of 3 years' experience of programming spec's through to delivery and implementation. Relocation assistance provided

CONSULTANT DON PHILP TEL 021-454 7906

## PROGRAMMERS TO SYSTEMS ANALYSTS

**LEEDS UP TO £7,000**

A substantial quantity of new positions are now available with an expanding Leeds installation. The clients seek staff with a minimum of 3 years' experience any machine and language and will judge each applicant on his/her potential contribution towards the installation. Good opportunities are good. Please complete the attached application form and return it ASAP. Job specs will be forwarded by return.  
CONSULTANT DON PHILP TEL 021-454 7906

## ANALYST/PROGRAMMERS

**SURREY TO £6,000**

Our client requires practical knowledge of programming with at least 2 years' COBOL experience. Equally, they seek practical experience in the design and implementation of at least 2 major projects, preferably associated with the design of a new computer. Experience of ICL or Data General equipment would be advantageous. Applicants must be self motivated and capable of working in a bureau environment.  
CONSULTANT CAROL PROUDMAN

## ANALYST PROGRAMMERS AND PROGRAMMERS

### ESSEX TO £5,000

Experienced programmers are urgently required for a group based in Colchester. A variety of client systems will be offered.

Successful applicants will be offered a minimum of 2 years' experience and familiar with Cobol or PL/I in a commercial industrial environment. Interviews will be arranged within a week of application for appropriate candidates.

CONSULTANT JOHN WOOD

## TURNKEY SALESMEN

**U.K. TO £8,000**

A large mini producer requires numerous additional salesmen to assist with expansion plans throughout the U.K. and to cover a wide range of clients from small to medium commercial users. Office locations include Birmingham, Manchester, Bristol and Liverpool. All candidates must possess a minimum 1 year's experience including small business systems.

CONSULTANT DON PHILP TEL 021-454 7906

## SYSTEMS ANALYST

**MIDDLESEX TO £6,600**

The successful applicant will have at least 3 years' experience, programming experience, preferably using COBOL. Equally, he/she will have designed or controlled the development of major computer systems through implementation. On-line systems experience, especially with process programming knowledge is sought, preferably using CICS. All applicants must have good IBM 370 experience.

CONSULTANT JOHN WOOD

## COMPUTER DEVELOPMENT MANAGER

**S.W. LONDON TO £7,750**

Preference will be given to products or design level candidates capable of controlling 10 operations and 4 analysts and programmers. A successful candidate will report to the Data Processing Manager. The post also involves responsibility for the coordination and design of complex systems, ability to control and integrate tasks to analyse and programme, ability to define and maintain work activities within programmes and to set and maintain standards. Previous experience of MVS would be advantageous although other hardware will be acceptable.

CONSULTANT DON PHILP TEL 021-454 7906

## OPERATORS

**KENT £2,800 PLUS 25% SHIFT**

Our clients urgently require operators with ICL 1900 GEORGE II and MANUFACTURING experience. A minimum 1 year's operating experience in a sensible installation is a 19027 with 11 disk drives and 80K core memory. Shifts will be 10 hours on 10 hours off, working with an extended night shift for which overtime rates are paid. A modern office block is situated close to clockhouse and Kent Station.

CONSULTANT CAROL PROUDMAN

## ANALYSTS

**LONDON E1 TO £6,000**

Candidates should possess IBM experience, preferably with knowledge of COBOL and a minimum of 3 years' experience.

Analyst must have an advanced knowledge of File Design techniques and information gathering. Equally, he/she should be able to assist with feasibility studies and preparation of systems proposals.

Any site visit will be arranged to discuss the client's needs and to explain the requirements of the programming spec's through to delivery and implementation. Relocation assistance provided

CONSULTANT DON PHILP TEL 021-454 7906

## ANALYSTS PROGRAMMERS & PROGRAMMERS

**LEEDS TO £7,000**

A substantial quantity of new positions are now available with an expanding Leeds installation. The clients seek staff with a minimum of 3 years' experience any machine and language and will judge each applicant on his/her potential contribution towards the installation.

Good opportunities are good. Please complete the attached application form and return it ASAP. Job specs will be forwarded by return.  
CONSULTANT DON PHILP TEL 021-454 7906

## PROGRAMMER/ANALYST

**SURREY TO £6,000**

Education to HNC/Degree level is sought. Duties will include one or more of the following:

(1) Programming in a high level Test Application language (ATLAS) analysis/validation of ATLAS programs.

(2) Programming in AIMS 200 Symbolic Assembler (ATE Controller/Compiler type 800).

(3) Programming in DEC PDP-11 ASSEMBLER, use of CORAL 65 programming. We seek some experience with assembly language and symbolic test techniques. Candidates ideally will currently be employed either by mainframe manufacturers or semiconductor companies.

CONSULTANT DON PHILP TEL 021-454 7906



EMS CONSULTANTS LTD  
61 LOWER STREET  
NEWCASTLE UNDER LYME  
STAFFORDSHIRE, ST5 2RS  
Telex 36636

Management Services & Computing Division  
Telephone : 0782 623665/6/7/8  
Employment Agency & Employment  
Business Units No. M65  
Telex 36636  
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International Management Services Ltd. is a leading recruitment agency specialising in permanent and temporary staff placement. We offer a wide range of services including executive search, management selection, executive placement, temporary staff, contract staff, and executive relocation. Our aim is to provide a high quality service to both our clients and candidates. We believe in equality of opportunity and treat all applicants with respect and dignity. We are committed to maintaining the highest standards of service and professionalism. We are always looking for new opportunities to expand our services and to meet the changing needs of our clients and candidates. We are always looking for new opportunities to expand our services and to meet the changing needs of our clients and candidates.

For Office Use Only  
Company Ref. No.

Reason for Seeking Change

Details of type of position wanted

Additional Information...  
Please explain below, in an 8-10 line précis, your current duties and applications experience

Please show the number of years experience of the following. Where your experience is not specified please use the blank spaces.

HARDWARE	OPERATING SYSTEM	LANGUAGES	PACKAGES/SOFTWARE
IBM 360/370	DOS	COBOL	FILETAB
ICL 1900	OS	FORTRAN	DRIVER
ICL 2960/2970	MVT/MFT	ASSEMBLER	CICS
ICL 2903	GEORGE 1	PLAN	IMS
UNIVAC 1100	GEORGE 2	PL1	BOMP
UNIVAC other	GEORGE 3	RPG2	D BOMP
BURROUGHS 700/800	MCP	USERCODE	PERT
BURROUGHS other	EXEC 8	AUTOCODE	V SAM
HONEYWELL 66	GCOS	EASYCODER	IDS/TDS
HONEYWELL 6000	OS 2000/200	ALGOL	MICROFILMING
HONEYWELL other	VMER/VMEX	NEAT	TELEPROCESSING
NCR	J Level	CORAL	DMS
ICL System 4	DL1		
PDP			

HARDWARE	OPERATING SYSTEM	LANGUAGES	PACKAGES/SOFTWARE
Commercial	Bureau	Insurance	Scientific
Manufacturing	Banking	Education	Engineering
HARDWARE	OPERATING SYSTEM	LANGUAGES	

HARDWARE	OPERATING SYSTEM	LANGUAGES	PACKAGES/SOFTWARE
Commercial	Bureau	Insurance	Scientific
Manufacturing	Banking	Education	Engineering
HARDWARE	OPERATING SYSTEM	LANGUAGES	

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## ST. THOMAS' HEALTH DISTRICT (TEACHING)

Sharpey-Schafer Centre

**On-Line Hospital Computing**

The Centre has a HONEYWELL SIGMA 6 with 512KB of core and 432MB of disc, and a PRIME 300 with 256KB of MOS memory and 60 MB of disc. Terminals include VDU 5 teletypes, laboratory analysers and an optical mark reader. Information will be exchanged between the two machines via an asynchronous link when the appropriate software has been implemented.

The immediate need is for the development of a large on-line system to manage several hundred routine Haematology tests and reports per day. This will be integrated with other applications via a central file base.

Languages are FORTRAN, COBOL and CORAL. Structured programming techniques are employed using on-line facilities. There are currently vacancies for programmers to work on developing the Haematology application or on writing support software. Training can be provided where needed.

**Programmers**

Scale 1: £3,452-£4,421 plus £354 L.W.

Scale 4: £4,421-£5,326 plus £354 L.W.  
(depending on experience)

Applicants should have at least 12 months' relevant commercial or industrial experience, or an honours degree (or equivalent) in Computing Studies.

The Hospital has good canteen and social facilities and is close to Waterloo Station.

Application forms may be obtained from Personnel Department, St. Thomas' Hospital, London SE1 and should be returned by 28th September, 1978.

**THE OPEN UNIVERSITY****STATISTICS PROGRAMMER**

£3,883 - £6,585 under review

A vacancy has arisen within the Statistics Team in the University's D.P. Division. This team is responsible for the development of orthodox systems providing statistical analyses of administrative data as well as providing the computing expertise required in specialist statistical and survey work undertaken by the Institute of Educational Technology. The team's staff is divided fairly evenly between these facets of our work. Most of the programs in the administrative statistics section are written in COBOL but some use is made of FORTRAN. The more sophisticated statistical work requires FORTRAN programming and the use of statistical/survey analysis software such as the SPSS and OSIRIS packages.

The person we are seeking will ideally have two or more years' COBOL and/or FORTRAN experience but a less experienced applicant with suitable potential would be acceptable. He or she will be required to apply their existing computing skills to the ongoing work in the team while extending their range of expertise. This is an excellent opportunity for a suitable person to broaden their experience through using a variety of programming languages and statistical software as well as through a limited amount of user contact. Exposure to statistical methodology is not essential but would be considered an advantage.

We offer seven weeks' holiday, and excellent social and sporting facilities. Application forms are available, by postcard request please, from The Recruitment Office (3DST/1). The Open University, P.O. Box 75, Walton Hall, Milton Keynes, MK7 6AL or telephone Milton Keynes 63404; there is a 24-hour answering service on 63888. Closing date for applications 28th September, 1978.

**Senior Analyst**  
£4,461 - £4,761 p.a. plus supplement  
of £312 p.a.)

Applications are invited for the post of Senior Analyst in the Department of Computing Services. The successful candidate will be responsible for the systems required by the Administration (e.g. Student Records).

The Polytechnic has recently installed a DEC-20 to replace a 1905 and the Administration programs are currently being converted.

This post will require a good working knowledge of COBOL gained over a period of about 3 years. Experience of DEC-10 or 20 systems would be an advantage, as would a knowledge of I.C.L. 1900, COBOL or RPG2. A manufacturer training course will be arranged if necessary and facilities for further part-time study for higher qualification may be available to a suitable candidate.

Further details and form of application from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham. Closing date 9th October, 1978.

**TRENT POLYTECHNIC NOTTINGHAM**

CARDIFF UP TO £5000

**PROGRAMMER/ANALYSTS**

We require at least 12 months' programming experience

Tel. 0222 33131 extn. 3328

**BUILDING SOCIETIES**

A RECRUITMENT FEATURE

On September 28th Computer Weekly will be highlighting career opportunities with Building Societies.

To advertise in this high reader interest feature contact Josee Paolo or John Farrar on 081 8484 or 281 8088

**PLYMOUTH POLYTECHNIC**

Computer Centre

**SENIOR PROGRAMMER**Salary: £4461-£4761  
(+£312 p.a. supplement)**Systems Designers**

Saudi Arabia £8,800-£10,900 after tax

You have at least 2 years' experience using mark IV or a 370 operating under OS/VSE. Have you at least 1 year's experience of COBOL, PL/I and time sharing option?

Have you worked on major materials/inventory control applications?

**ARA**  
Astral Recruitment Associates**RESEARCH ASSISTANT OR ASSOCIATE**in charge of  
**COMPUTING FACILITIES**

The appointment is on a Research Assistant (£2,950-£5,058) or Research Associate (£4,385-£5,730) scale, depending on age and experience.

Application forms to be returned by 29th September 1978 can be obtained with further particulars from the Personnel Officer, Plymouth Polytechnic, Drake Circus, Plymouth PL4 8AA.

Applicants with relevant electrical engineering or electronics qualifications and some experience in one or more of these fields will be preferred:

(i) interfacing mini computers (preferably PDP's); (ii) using operation systems (preferably RT-11); (iii) computer maintenance. Some programming ability (especially in assembler code) also an asset.

Applicants should write to The Director, M.R.C. Unit on the Development and Integration of Behaviour, University Sub-Department of Animal Behaviour, Madingley, Cambridge CB3 8AA.

Application forms and further particulars from the Regional Personnel Officer, North West Thames Regional Health Authority, 40 Easthampstead Terrace, London, W2 3JR (Telephone No. 01-262 8011, Ext. No. 201), returnable by September 28, 1978, quoting reference number 350/CW/14/9. Applicants from outside the service commence at the minimum of the scale.

**FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY**Ring Eddie Farrell or  
Mark Williams on  
01-261 8028  
01-261 8019**CONTRACT PROGRAMMERS and ANALYSTS**2 Assembler Singer 10  
2 ICL 1500  
1 Cobol ICL 2903  
3 Cobol Univac 1110  
2 Cobol IBM 370-158  
2 Cobol PL1-DL1 Cics  
1 PDP Macro - 11  
1 Cobol 370-135 DOS-VSall area  
all areas  
S. London  
Essex  
Herts  
W. London  
S. London  
S. London

We have also an urgent need for Senior Analysts in London

Telephone me now on 01-531 9131  
Tricia Watts  
Manhattan, 6-8 Lark Hall Road, London E.4**THE CITY UNIVERSITY Computer Programmer**

Required to join a small team involved with administrative systems within the University which had the use of a dual ICL 1905 E configuration, operating under GEORGE and MAXIMOP, and a separate Philips visible records machine.

Applicants should be familiar with ICL 1900 equipment, software and operating systems and have sound commercial experience using COBOL and at least one low level language.

Department is DYNAMIC and DEVELOPING at a rate of KNOTS! Among other applications to be designed is an inland transport movement.

3/4 years' analysis experience with knowledge of COMMUNICATIONS and COBOL/PLAN programming an advantage.

Please write to the Personnel Office, The City University, St John Street, London EC1V 4PB or telephone Mrs. M. McMaster, Personnel Assistant, on 01-253 4399 extension 334 for an application form and further details.

**FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY**Ring Eddie Farrell or  
Mark Williams on  
01-261 8028  
01-261 8019**CRC INFORMATION SYSTEMS AT SLOUGH**Requires an  
**ELECTRONICS ENGINEER**

Location: Slough to assist the Communications Manager in the design and maintenance of electronic equipment. A familiarity with minicomputer and/or data communications equipment is desirable but not essential. Some experience in COBOL and PL/I is required.

Apply in confidence to:  
Chris Dennis  
Communications Manager  
CRC Information Systems Ltd.  
1000 Gresham Street  
SLOUGH SL1 5SP

These positions offer the usual employment benefits including substantial relocation packages. Travel assistance, company pension schemes, etc.

DON'T TREAD WATER... DON'T JUMP IN AT THE DEEP END... SWIMMING IN A SEA OF UNSUITABLE JOBS...

CONTACT COLIN SHINGLETTON —

Meteor Computer Consultants Ltd.  
Barry House, 20-22 Worple Road, Wimbledon, London SW19 4DH  
Telephone 01-946 4424

If you have, and you're a hold a full UK driving licence, we would like to hear from you as soon as possible on behalf of the Arabian American Oil Company (AAO) AAO

Appointment are sinecure status based on 12 month renewable contract. Bachelor have 30 days paid UK leave between contracts, married men on single status have 2 weeks paid UK leave every 1 months with 3 days between contracts. Excellent medical care free, housing is an conditioned and residential facilities are first class.

For further details, please write or, better still, telephone, quoting reference N361, to Richard Darvell, Astral Recruitment Associates, Astral House, 1, 19 Allday Street, London W1R 0LY. Telephone 01-630 2514 (answering after 6pm).

**ARA**  
Astral Recruitment Associates

**RESEARCH ASSISTANT OR ASSOCIATE**in charge of  
**COMPUTING FACILITIES**

The appointment is on a Research Assistant (£2,950-£5,058) or Research Associate (£4,385-£5,730) scale, depending on age and experience.

The appointee will be required to manage and develop a computer system (PDP 8, 11 and 12) used for storing and analysing behavioural data, and to design and build special research equipment.

Applicants with relevant electrical engineering or electronics qualifications and some experience in one or more of these fields will be preferred:

(i) interfacing mini computers (preferably PDP's); (ii) using operation systems (preferably RT-11); (iii) computer maintenance. Some programming ability (especially in assembler code) also an asset.

Applicants should write to The Director, M.R.C. Unit on the Development and Integration of Behaviour, University Sub-Department of Animal Behaviour, Madingley, Cambridge CB3 8AA.

Application forms and further particulars from the Regional Personnel Officer, North West Thames Regional Health Authority, 40 Easthampstead Terrace, London, W2 3JR (Telephone No. 01-262 8011, Ext. No. 201), returnable by September 28, 1978, quoting reference number 350/CW/14/9. Applicants from outside the service commence at the minimum of the scale.

We have clients who require contract or permanent staff to join their development teams.

The work requires a good knowledge of COBOL, or a low level language (ASSEMBLER, PLAN, USERCODE, etc.). Contract personnel can expect assignments of 6 months at attractive rates. Permanent employees enjoy good salaries and excellent conditions of employment.

Please contact either Ken Grimsley or Jeff Worsley on SHEFFIELD (0742) 25069.

Fraser Williams  
computer consultants

Can we interest you in a CRUISE?

Shipping company requires a Financial Systems Analyst with 3/4 years' proven experience to re-assess and maintain many of the company's existing financial systems.

Extra benefits include travel expenses, pending re-location.

This Company also needs PROGRAMMERS with one to two years' COBOL experience. Applications include general commercial systems and payroll, stock control and accounting ledgers.

COBOL experience on any large mainframe considered.

**ANALYST/PROGRAMMER £5000**

ICL 1900 COBOL/PLAN

International Company involved in Freight/Containers. Our client is looking for an all-rounder to become part of a team currently implementing an ON-LINE shipping system.

Department is DYNAMIC and DEVELOPING at a rate of KNOTS!

Among other applications to be designed is an inland transport movement.

3/4 years' analysis experience with knowledge of COMMUNICATIONS and COBOL/PLAN programming an advantage.

**ANALYST/PROGRAMMER £4500**

2903/4

Chemical Company on the South Coast currently operates a 1901A and has vacancies for experienced staff to strengthen their programming teams, so that an efficient ON-LINE ORDER ENTRY system can become live as soon as the current machine is replaced by a 2903/4. JCL experience a distinct advantage.

These positions offer the usual employment benefits including substantial relocation packages. Travel assistance, company pension schemes, etc.

DON'T TREAD WATER... DON'T JUMP IN AT THE DEEP END... SWIMMING IN A SEA OF UNSUITABLE JOBS...

CONTACT COLIN SHINGLETTON —

Meteor Computer Consultants Ltd.  
Barry House, 20-22 Worple Road, Wimbledon, London SW19 4DH  
Telephone 01-946 4424

Space reservations should be made as soon as possible to:

Owen Kelly — Manchester — 061-872 4211

Eddie Farrell — London — 01-261 8097

Copy Deadline: PM Friday before

**COMPUTER WEEKLY**  
THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER

**UNIVERSITY OF ST. ANDREWS Department of Computational Science**

Applications are invited for a post of

**RESEARCH ASSISTANT**

to work for one year on a project involving the development of software tools for micro-programmable computers. The successful candidate must be proficient in both high and low level computer programming. The project is supported by the SRC and will continue for a further year.

Salary: £3,189-£4,601 (under review)

Applications (two copies) including a curriculum vitae and the names of two referees should be sent by 5th October, 1978, to the Establishments Officer, The University, College Gate, St. Andrews, Fife, Scotland, KY1 6WZ.

Enquiries: Tel. 031-344 2500 (Ext. 276).

Further details, please write or, better still,

telephone, quoting reference N361, to Richard Darvell,

Astral Recruitment Associates,

Astral House, 1, 19 Allday Street,

London W1R 0LY.

Telephone 01-630 2514 (answering after 6pm).

For further details, please write or, better still,

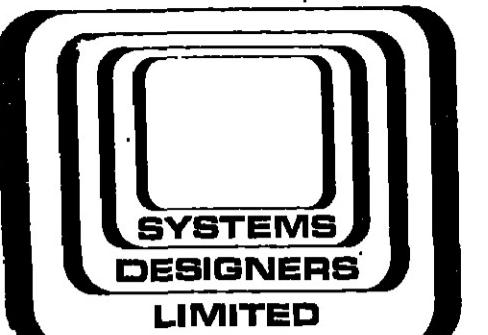
telephone, quoting reference N361, to Richard Darvell,

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London W1R 0LY.

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# PROGRAMMERS FOR MINI AND MICRO REAL TIME APPLICATIONS

Systems Designers Limited is a leading well-established and expanding Software Systems Consultancy specialising in mini-computer and microprocessor real-time applications, and operating at the forefront of technology. Growth areas of the Systems Division include:

- Communications —** Emulators, Message switching, Telex systems, Communications Management Systems, Computer Communications.
- Industrial —** Process control and Monitoring, Plant Control, Simulation, High Speed data analysis.
- Military —** Modelling, Avionic Systems, Complex rigs, Simulators, Microprocessor missile systems.

Systems Designers Limited controls the career progression of its staff to give them a wide variety of experience, both of project applications and of computer systems. The company is situated on the Surrey/Hampshire border, with good road and rail links to London and yet surrounded by attractive countryside.

Systems Designers Limited require:

**Graduates**

Your education has given you a good academic training. Systems Designers Limited will use this to provide you with a wide practical computing experience. If you have a degree or expect to qualify shortly in a numerate discipline then contact us to discuss your opportunities.

Up to £3,600

**Programmers**

Programmers are required with up to 2 years experience. As a leading company in minicomputer and microprocessor systems, Systems Designers Limited can provide you with a wide variety of experience in the technical computing fields.

Up to £4,500

**Software Engineers**

Systems Designers Limited require software systems engineers with up to 5 years' experience in Communications, Industrial or Military systems. We can provide you with a rewarding career at the forefront of technology.

Up to £6,500

If you can match the challenge of a varied and demanding career, then telephone or write to us to arrange a chat or request an application form.

Contact: Bill Hockey

Operations Director  
Systems Designers Limited  
Systems House  
57-61 High Street  
Frimley, Surrey GU16 5JJ  
Cambridge (0276) 63471

Telephone:

Up to £3,600

Up to £4,500

Up to £6,500

Up to £3,600

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## Abraxas Recruitment Division

**ABRAXAS**

West End House  
11 Hills Place  
London W1H 1AU

**01-439 8891**  
**OPERATIONS**

### OS/VSI MANY IMMEDIATE VACANCIES!

Skilled OS/VSI OPERATIONS staff at all levels are in great demand at present. Companies are offering highly competitive salaries with an ever increasing number of fringe benefits. Jobs include both DAYS ONLY and shift working positions. Opportunities in all areas including TECHNICAL SUPPORT, DATA CONTROL and OPERATION. Listed below are some of the current requirements. Listed below are some of the current requirements.

Please ring NOW for further details:  
C. LONDON OP. 1 YR. + £4,500+  
KENT OP. 16 MTHS TO £4,200  
2 SHIFT

MIDDLESEX OP. 1 YR. + TO £4,350  
SURREY OP. 1 YR. + £3,800  
MIDDLESEX OP. 1 YR. + £4,100 J/GEN

**BURROUGHS C £4,600**

SURREY SENIOR OPS. and OPS required for well-established computer system undergoing systems modification. We have created openings for experienced Operators who wish to further their experience. Excellent working conditions and staff benefits.

M/GEN

### ICL 1900/2900 RETRAINING OPPORTUNITIES

If you have at least 6 months' OPERATING experience on any ICL MACHINES, we may well have a position that will interest you. Our clients will assist with any relocation necessary and in many cases upgrading from 1900-2900 offers excellent training opportunities.

Below are just some of the many vacancies, perhaps one of these may suit? If not — contact JASMINE DAINES for more information.

MIDDLESEX	OP. 2 YRS. +	TO £4,700
HERTS	SENIOR OP.	2 SHIFT TO £4,900
HANTS	OP. 1 YR. +	TO £4,000
S. LONDON	OP. 2 SHIFT	£4,300
HERTS	OP. 2 SHIFT	TO £4,900
C. LONDON	OP. 2 SHIFT	£4,900
KENT	OP. 1 YR. +	£4,000
DERBS	SENIOR OPS. ANY ICL	£4,800
	J/GEN	

£/GEN

**PDP/DEC C £4,500**

C. LONDON OPERATORS required with or without PDP/DEC experience for Merchant Bank currently running PDP11/70 x 2. At least one year's experience on ANY MAINFRAME will suffice.

M/GEN

**NCR C £4,000+**

C. LONDON OPERATORS/SNRS required for various positions in and around London. Minimum of 6 months experience on NCR machines required.

M/GEN

FOR VACANCIES IN YOUR AREA PLEASE RING ABRAXAS NOW

Abraxas Computer Employment Ltd.

## Computing Staff

### LONDON SE1

The Computing Branch provides general computing services and facilities to administrative departments, research staff and Power Stations in South East England. We require:

### PROGRAMMER

For work on an ICL 1903 computer, operating under GEORGE3 on systems for accountancy, stores control, purchase ordering and power station maintenance scheduling. At least one year's practical experience of COBOL required and knowledge of FORTRAN would be an advantage.

Salary within a scale rising from £4,194 to £5,735 per annum according to qualifications and experience.

Vacancy Number 1389/78/CW

### SYSTEM SUPPORT ASSISTANT

To join the team that provides support services for remote users on a variety of terminals connected to the ICL 1903. The work will include maintaining data communications software, system software, compilers, packages and utilities. Applicants should have had experience with data communications systems and operating systems and programming experience would be an advantage.

Salary within a scale rising from £4,640 to £6,850 per annum according to qualifications and experience.

Vacancy Number 1391/78/CW

The minimum qualification for both posts is 'A' level mathematics and a degree or professional qualification would be preferred. Appropriate subjects would be computing science, mathematics, physics, economics, electrical/electronic engineering.

Applications quoting the relevant vacancy number giving full details should be forwarded to the Personnel Officer (Recruitment),

Central Electricity Generating Board,  
Bankside House, Sunner Street,  
London SE1 9JU to arrive by  
25 September 1978.

### South Eastern Region

Next week  
Yorkshire will  
be in  
Manchester



We are Yorkshire Imperial Metals Limited and next Tuesday we want to meet you in the centre of Manchester at the Manchester Interviewing Centre, 1st floor, Scottish Mutual House, 35, Peter Street, and on the 5th October we will be in London. We'll be there any time between 10am and 8pm, so just come in and find why we have so much to offer.

We have recently changed our hardware to a 370/148 running under OS/VSI and supporting CICS and DL/1 and currently need the following people:

**SYSTEMS ANALYSTS** With around 5/6 years experience and a detailed knowledge of hardware and software to investigate new techniques.

**SENIOR PROGRAMMERS** With and around 4/5 years experience and a thorough knowledge of programming to handle large and sophisticated programme suites.

Spare a few minutes next Tuesday and call in. If you can't make it, phone us on Leeds (0532) 701107 Ext. 424, or write to Senior Appointments Officer, Yorkshire Imperial Metals Limited, P.O. Box 168, Leeds, LS1 1RD.

Applicants should preferably be graduates or have a relevant professional qualification.

We can offer salaries of around £5K-£6K, many benefits and exceptional prospects within the company, part of a major British Group. We will also give generous relocation expenses.

Starting salary will depend on qualification and experience in an IBM OS/VSI installation after thorough training will be given to candidates keen to enhance their job satisfaction.

### COUNTY OF CLEVELAND COMPUTER SERVICES UNIT PROGRAMMER/ANALYSTS (Up to £5,073) (includes supplement)

The unit wishes to recruit one or two people to its existing programmer/analyst staff engaged on software development, implementation and maintenance of large scale computer systems, both batch and on-line, using some of today's most sophisticated equipment including twin CPU's.

An attractive career structure is in operation which allows for progression according to the complexity, work and responsibility undertaken.

Starting salary will depend on qualification and experience in an IBM OS/VSI installation after thorough training will be given to candidates keen to enhance their job satisfaction.

Application forms from the Director of Computer Services, 5th Floor, Red House, 67 Corporation Road, Middlesbrough, Cleveland (Telephone 0642 248155, Ext. 2351) to whom completed forms should be returned by 2nd October, 1978.

## SENIOR PROGRAMMER

Salary up to £7,230 per annum

CAN YOU HANDLE AN ON-LINE SYSTEM?

Thames Valley Police are looking for an experienced Senior Programmer to perform development and maintenance work on a computer on-line system. A challenging series of extensions to this system and to associated IDS batch programmes is envisaged.

The successful applicant will have extensive COBOL experience on an on-line system, preferably but not exclusively with Honeywell 6000/level 66 using IDS & TDS. He/she must be willing to take an increasing interest in the maintenance of existing software and be capable of working to rigid standards. He/she will also have the ability to communicate at all levels.

Over 5 weeks' holiday, pension scheme, assistance towards removal expenses.

Application form and further particulars from: The Principal Personnel Officer, Thames Valley Police Headquarters, Kidlington, Oxford, OX6 2NZ (Tel. Kidlington 4323 ext. 252).

## SYSTEMS ENGINEERS

Preferably with mini experience for a large computer manufacturer. Salary £8,000.

Telephone: Manhattan 951-9131, ask for Jim Taylor.

## INDIA SOFTWARE MANAGER and MARKETING MANAGER

A prominent Indian manufacturing company has recently formed a new division to build and distribute on a world-wide basis an advanced commercial microcomputer.

These opportunities offering excellent salary and fringe benefits are open only to Indian Nationals.

Applicants should telephone Mr. D. Stanley on Bifield 4951 or 5181. Interviews will be arranged by interview.

## Sales Bit and Hex Kid have been held over because of pressure on space

### OPERATORS

#### IBM OPERATORS

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